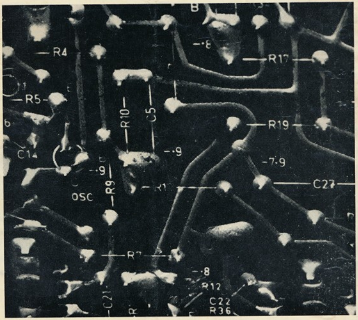
AMATEUR RADIO

JANUARY 1964



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Direct subscription rate is 24/- a year, post paid, in advance. Issued monthly on the first of the month, January edition excepted.

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OUR COVER

An enlarged portion of a printed circuit provides a modern style type of painting for our January edition. (Incidentally, all 1964 covers will be a red colour to differentiate between the 1963 (green) issues of "A.R.")

FEDERAL COMMENT

★

The commencement of another year is the usual time chosen for looking to the future and injecting new ideas into an organisation such as ours. This year of 1964 promises to be no exception to the rule. However, a few comments of the previous Editorial are in order for it had not been confirmed at that time what the final results of the Extraordinary Conference yielded. We are happy to confirm that the final Plenary meetings of the Conference, dealing with frequency extensions for the Space Services, preserved the status quo for the Amateur.

In Region 3, in which our particular interest lies, the Amateur band 144-148 Mc. is exclusively Amateur, and in addition a footnote has been added to the effect that Amateurs may use artificial satellites for communication purposes in this part of the band between 144-146 Mc. Our delegate to the Conference, Mr. Tinkler, has now returned to Australia and submitted a verbal report to Executive on his trip. A written report will be published in this journal in the near future.

It is quite obvious from this report that the Amateurs would not have fared as well as they did had it not been for the preliminary work and exhausting discussions carried out by Amateurs with their administrations prior to and during the Conference. One most important point arising from this Conference appears to be the general feeling that future Conferences will follow the lines of this one, in that it seems unlikely that a full scale Conference such as the 1959 I.T.U. will continue in the future. They are more likely to take the form of Conferences dealing with particular Services such as the International Civil Aviation Organisation or Shipping.

This will mean shorter Conferences at more regular intervals because it has been recognised that a period of four to five months at a Conference is too long and too wearing on the nerves of the delegates. For this reason, the foresight of Federal Council in deciding to immediately start collecting funds was most timely. Some members have questioned the reasons for requiring so much money to be raised by Divisions. It is the opinion of Federal Council that a Fund must be set up in order to have representation as and when required. We may not be so fortunate in the future as we have been in the past with our delegates who have had the backing of their companies in regard to salaries and expenses.

The Amateur has now grown in stature in international affairs, but in such growth must assume the responsibilities that it entails. He must now consider himself an important part of an international brotherhood which must be financially supported. It is certain that this subject will receive a great deal of attention at the next Convention, but it appears at this stage that an annual allotment from the membership subscription should be set aside in a fund for the Amateur Service. Call this a fighting fund if you wish, to protect our hobby, but despite its name, it should be raised in the interests of the Amateur Service as a whole. This in turn will mean greater co-operation between I.A.R.U. Societies, continual liaison to appreciate one another's problems and a greater sense of responsibility. This is the message then for the New Year—Let us all assume our proper responsibilities as members of the Amateur Service for a prosperous New Year.

FEDERAL EXECUTIVE, W.I.A.

CONTENTS

A SINGLE SIDEBAND SYSTEM FOR 144 Mc.

I. F. BERWICK, VK3ALZ*

It has long appeared to the writer that the ideal band on which to demonstrate the superiority of side-band for weak signal work is 144 Mc. Although it may take a little time for receivers to improve to the stage where the full 9 db. gain is realisable, it is hoped that the device presented here will pave the way towards that goal.

Despite the imposing title, this is a comparatively elementary device consisting of three parts—

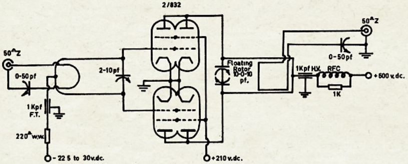
1. A transmitting up converter.
2. An AB1 driver stage.
3. A linear amplifier.

The design of such a converter calls for a little consideration. The problems are:—

(a) Linearity of the s.b. amplifiers.
(b) Spurious responses.
(c) Stability of the oscillator.
(d) Efficiency of mixer and amplifiers—an important consideration at 144 Mc.

It will be convenient to consider (a) and (d) in conjunction.

It transpires that some tube types which are highly suitable for mixer and amplifier service at h.f. on the grounds of linearity, are hopelessly inefficient at v.h.f.



Linear Amplifier.
1KPF F.T. = 1,000 pF. feed through capacitor.

Clearly there is little reward in restricting the s.s.b. generator to a single band transmitter. One normally spends considerable time, not to mention expense, in developing an acceptable s.s.b. signal in the s.b. generator. It is highly desirable to use this acceptable signal on each band one normally operates. Hence the concept of the transmitting converter.

It is convenient, therefore, to investigate the linearity of tube types known to be efficient at 144 Mc.

It appears that certain deflection amplifiers have the desirable characteristics. Of these, the 12BY7 is probably the best. This tube is used extensively in commercial converters. I did not have this type available, but found the 6CK6 to be satisfactory. Of the other types used, the 5763 is satisfactory in Class A or AB1.

The QE04/10 is a single ended beam tetrode on a B9G base and appears to be capable of good linearity and efficiency at 144 Mc.

SPURIOUS RESPONSES

Any given frequency, f_Z, can be generated by mixing any other pair of frequencies, f_X and f_Y, according to the formula:—

$$Z = X \pm Y.$$

However, certain combinations of X and Y will simplify the problem of suppression of the spurious responses.

Suppose we wish to obtain 144 Mc. s.b. We have available s.b. at the following frequencies: 4 Mc., 14 Mc., 50 Mc. Which frequency to choose?

We have—

(a) $140 + 4 = 144$
$140 - 4 = 136$

(b) $148 - 4 = 144$
$148 + 4 = 152$

(c) $130 + 14 = 144$
$130 - 14 = 116$

(d) $158 - 14 = 144$
$158 + 14 = 172$

(e) $94 + 50 = 144$
$94 - 50 = 44$

(f) $194 - 50 = 144$
$194 + 50 = 244$

Clearly—

(a) and (b) are both unsatisfactory.

(c) and (d) are both reasonably satisfactory.

(c) is a quite popular scheme.

(e) is highly satisfactory and is the scheme I have adopted.

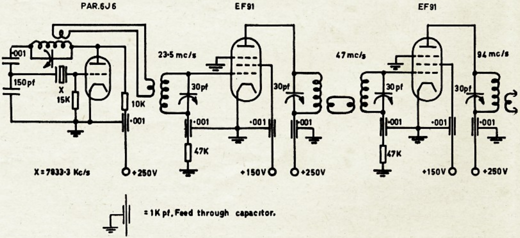
(Continued on opposite page)

* 107 Loongana Avenue, Glenroy, Vic.

Transmitting Converter, 50 Mc. to 144 Mc.

Circuit continued on opposite page.

1KPF = 1,000 pF. feed through capacitor.



In this discussion it is assumed that both s.b. signal and the injection signal are free from spuriouses. The matter of spuriouses in the 50 Mc. transmitter was discussed in my previous article. An examination of the converter circuit will reveal that extensive measures have been adopted to eliminate spuriouses from the injection chain.

STABILITY OF THE OSCILLATOR

This is determined from the equation x = 30 — ∝, where x c.p.s. is the required stability of the injection chain oscillator, and ∝ c.p.s. is the overall stability of the s.b. source.

Since the practical aspects of oscillator stability have been adequately covered elsewhere and should be widely known, I do not propose to pursue this matter further.

LINEAR AMPLIFIER

The choice of tubes is strictly limited at 144 Mc. I have settled for a pair of 832As—not because they are the ideal tubes to use, but because they were available and efficient, and will satisfy the power requirement. They can also be replaced at a later date by the better QQE06/40s, with very minor circuit changes. The amplifier is identical with my 50 Mc. linear except that the coils are replaced with lecher bars and the negative feedback loop is omitted.

LINEARITY CHECKS

Despite what has been previously stated in this magazine and elsewhere, it appears that newcomers to s.s.b. (particularly the v.h.f. variety) imagine that a signal can be put on the air without any form of linearity check whatsoever. Any similarity between the resulting signal and s.s.b. can only be described as a remarkable coincidence.

Linearity checks are a must! If you don't have the necessary equipment to do the job, beg, buy or build it. The procedure for linearity checks is adequately covered in the Handbooks. ●

PUSH-TO-TALK ON THE GELOSO G222TR TRANSMITTER

BILL MAGNUSSON, VK3AHT*

THIS article will be of interest to all owners of the above transmitter. When operating in nets and contests one soon realises the shortcomings of a T/R switch that has to be reached for and rotated. I suppose the ultimate would be a foot operated switch and suspended mike or straight out vox. This article deals with p.t.t. but the problems encountered would be common to all three methods.

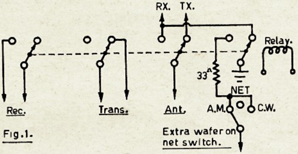


Fig.1.

The rather complicated switching system dictates the use of some sort of relay control. A close inspection of the circuit reveals several problems, however, and discloses the reasons for some of the odd habits of this transmitter.

Most users will have noticed that when listening on your own frequency there is a tendency for the carrier to linger for some seconds after switching from transmit to receive. This is annoying and is due to the power supply not having any permanent bleeds. This has been overcome (to a degree) in the original circuit by using a wiping contact on the T/R switch which momentarily shorts a bleed resistor across the h.t. supply of the driver/sub-modulator. If this rotation is done fairly slowly the feedback and fade-away problem is eliminated, but if one is to use a relay here, circuit modifications must be made. That is unless you happen to have a relay with a wiping contact.

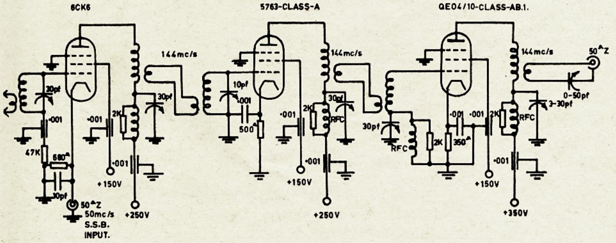
The net signal also tends to linger. This is because the net switch does not provide this bleed.

By using a four-pole double-throw relay to switch antenna and h.t., and by installing an extra wafer on the net switch, we can achieve very fast p.t.t. operation. The relay is wired as in the diagram so that section A controls the receiver, section B controls the transmitter h.t., section C controls the antenna change-over, and section D inserts the bleed resistor across the appropriate power supply.

Now due to the fact that this power supply is brought into action in the net position, provision must be made to remove this short at the same time. This is done by salvaging a switch wafer and longer shaft for the net switch. Mine came from a wrecked Geloso v.f.o. By an amount of gentle

(Continued on Page 21)

* 359 Williamstown Rd., Yarraville, Vic.



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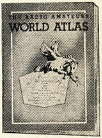

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S-METER, G.D.O., F/S. METER AND ABSORPTION WAVEMETER

W. H. FLETCHER, B.Sc. (G3NXT)

MEASURING instruments are an essential part of any Amateur's equipment, both to enable him to keep within the terms of his licence and to check on the effects of experimental adjustments to his equipment. Unfortunately, good meters are no longer as readily available or as cheap on the surplus market as they used to be, and the more the measuring units which can be designed to share one meter, the cheaper these instruments are to construct—the idea being, of course, to use one good meter movement for a variety of purposes.

THE S-METER

The basic unit used at G3NXT consists of a valve-voltmeter type S-meter, as shown in Fig. 1. It is housed in a sloping-front meter case measuring 6" x 6" x 5" and is on the right in the picture. Its controls are, from left to right, the g.d.o. sensitivity control, S-meter sensitivity, and meter switch, which should preferably be a good quality ceramic item. The meter used

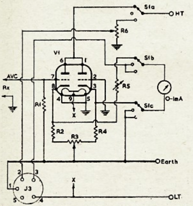


Fig. 1.—Connections for the S-Meter Circuit, applicable to any Rx with the a.v.c. drive accessible. The 0-1 mA. meter movement is separately connected to the five-way socket J3, so that it can be picked up by an externally connected g.d.o. or absorption wavemeter.

in the prototype is 3" 0-1 mA. moving-coil but any 0-1 mA. or 0-500 μA. meter with a clear scale is equally suitable.

The valve V1 is mounted on an L-shaped bracket fitted to the rear panel of the meter case by the bush of the balance potentiometer R3. The circuit is conventional, except that the sensitivity control R5 is placed in series with the meter, rather than using a potentiometer across the a.v.c. line. This arrangement protects the meter from overloading, whilst still giving a useful reading on weak signals.

The a.v.c. voltage can be derived from any convenient point on the receiver a.v.c. line. In the prototype it was picked up from one of the inter-sectional coupling boards in the author's R107, and fed via screened cable to the front panel socket originally intended for the operator's lamp, having first removed and taped the lamp leads. A length of screened lead, fitted with wander plugs may then be used to connect the unit to the receiver.

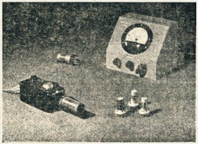
With the CR-100, a.v.c. voltage is most conveniently derived from the a.v.c. line end of the resistor (marked R1 in the CR-100 manual) which feeds the first r.f. stage; this is located in a vertical position at the rear of the r.f. compartment.

CIRCUIT ACTION

When a signal causes the receiver to develop an a.v.c. voltage, it is applied to g1 of the double triode V1. This reduces the current flowing through V1a and unbalances the bridge formed by the cathode resistors R2, 3 and 4, and the two sections of the double triode V1—causing a current to flow through the meter, which therefore gives an indication of relative signal strength.

To set up the S-meter, the meter switch S1 is set to the appropriate position and the receiver aerial terminal shorted to earth. The balance potentiometer R3 is adjusted to give a zero meter reading. Next connect an aerial to the receiver and tune in a strong local signal. The sensitivity control may be adjusted for full scale deflection (S9+). The author used his Top Band transmitter feeding a separate aerial for this adjustment. After a little experience the user will be able to interpret the deflection in terms of S-points.

Auxiliary units to make fuller use of the meter can be plugged into a five-pin Belling-Lee socket J3 mounted on the rear panel. H.t. and heater voltages are supplied as well as a direct connection to the meter. With the range switch in the centre position, the meter is connected directly to pins 1 and 3



The apparatus described by G3NXT in his article. The S-meter panel instrument is used also for the g.d.o. (left foreground), for which plug-in coils are used. The idea, basically, is to make the most of one really good panel instrument—in this case, a 3 in. 0-1 mA. moving-coil meter. The circuitry shows how this is done.

and is available for measurements, in addition to the primary purpose of providing an absorption wavemeter.

ABSORPTION WAVEMETER

The absorption wavemeter may be built into a small plastic, bakelite or paxolin box of similar dimensions to the case used for the grid oscillator.

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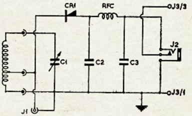


Fig. 2.—Circuit of the Absorption Wavemeter using a diode rectifier. For panel meter indication, a plug connects to socket J3 in Fig. 1.

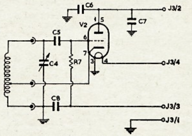


Fig. 3.—The G.d.o. circuit used by G3NXT, with a 6C4. The unit derives its power and gives a meter indication by plugging it in as marked to J3 in Fig. 1. The sensitivity control for the g.d.o. is R6 in the Fig. 1 circuit.

Table of Values

Figs. 1, 2, 3—S-Meter, G.do., and Absorption Wavemeter

C1, C4—50 pF. var.
C2, C3, C6, C7—0.001 μF. ceramic.
C5—100 pF. s.m.
R1—4.7 megohms.
R2, R4—500 ohms.
R3—500-ohm bal. potentiometer.
R5—10,000 ohms, S-meter sensitivity.
R6—100,000 ohms, 4w., g.d.o. sensitivity.
R7—22,000 ohms.
RFC—2.5 mH. r.f. choke.
J1—Panel mounting coax socket.
J2—Phone jack.
J3—Five-way socket (see text).
S1—3p. 3w. ceramic wafer.
CR1—OA81, or similar.
V1—12AU7, ECC82, or similar.
V2—6C4, L77, EC90.

COIL DATA

Wavemeter and G.D.O.

Freq. Range (Mc.)	Turns	Enamel Wire	Diam.	Turns per Inch	Tap at
1.7-3.4	100	30g.	1"	c.w.	25
3.3-6.7	38	30g.	1"	c.w.	12
6.2-12	38	30g.	½"	c.w.	14
11.5-21	32	22g.	½"	c.w.	12
20-40	15	22g.	½"	16	5
38-84	4	22g.	½"	16	1½

* Reprinted from "The Short Wave Magazine," September 1963.

The same coils are used as with the g.d.o. They plug into a octal socket in the end of the box and are tuned by a 50 pF. air-spaced variable condenser mounted in the top of the box and fitted with an 180° scale; this can be directly calibrated.

The crystal diode CR1 is connected to the coil tap in order to obtain more efficient energy transfer between the high-impedance tuned circuit and the low impedance diode.

If a small aerial is plugged into J1, a standard coax socket, the unit will function as a Field Strength Indicator. And if a pair of high-impedance phones are plugged into J2, phone can be monitored.

For use as an Absorption Wavemeter, the unit is held with the coil near the tuned circuit under investigation and the 50 pF. variable condenser adjusted for maximum meter reading. The coupling should be kept to the minimum necessary to obtain a sharp reading, in order to minimise pulling between the two circuits.

If the instrument range switch is in the left hand position (see Fig. 1) a Grid Dip Oscillator may be plugged into the auxiliary socket.

GRID DIP OSCILLATOR

The Grid Dip Oscillator, shown on the left of the photograph uses a 6C4 in a Hartley circuit with plug-in coils.

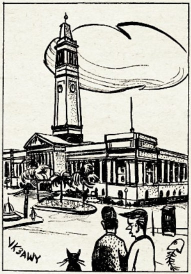
The prototype was constructed in a 4" x 1½" x 1½" ex-A.M. pressed steel-case, but an Eddystone die-cast box would be more suitable.

The valve holder for the 6C4 is on an L-shaped bracket in the centre of the case, whilst an octal valve holder is mounted in the end of the case, to take the plug-in coils. The coils are wound on Denco ½" poly. octal plug-in formers for ranges 3-6. The coils for ranges 1-2 are on short lengths of 1" diameter paxolin tube glued into octal valve bases.

The tuned circuit is completed by a 50 pF. variable condenser mounted between the coil socket and the B7G valve holder. R.f. leads should be kept as short as possible for the v.h.f. range.

The sensitivity control R6, mounted on the main unit (see Fig. 1), controls the h.t. voltage to the oscillator. Some adjustment is necessary to compensate for variation of grid current with frequency, i.e. on change of band.

The g.d.o. will check the resonance of tuned circuits by noting the frequency at which a dip occurs in the grid current when the oscillator coil is coupled to an unknown circuit. It may also be used as a signal generator for testing receivers and converters. ●



"Well it looks a darned sight better without the call sign hovering above it."

PROJECT OSCAR

This is directed to all u.h.f. groups, club leaders, s.w.l.'s and the whole Amateur fraternity. Oscar III. will, it is hoped, go up in April 1964, so be in it.

Oscar III. will be a communications satellite, and some very good DX is expected from it, particularly on the u.h.f. bands. So chaps now is the time to organise in groups and be ready to report on it, and also to contact other Hams through it. It will have a power of some two and a half watts. Remembering that Oscar I. and II. had only 300 milliwatts, some 52 reports came from Australia and the islands. The top number of loggings made by any one Ham was 51. This was made by VK1VP, of Canberra. This is the sort of a report that is appreciated.

It is hoped that all States will select their State Co-ordinator now and go to it, letting all and sundry know about Oscar III. As news comes to hand, it will appear in this magazine, on W.I.A. broadcasts, and in the various Bulletins. There will, it is hoped, be a Oscar III. network set up on 80 metres. You will have had some information in your State by now, so get cracking.

A model of Oscar will be on display in the various States soon, when we have found a way to get it around and at the same time cared for. No damage must befall this model as it has a long way to get yet.

Well chaps not too much more at this stage, see you later. May I take this opportunity to extend to all a very merry Xmas and a happy New Year.

—VK2HO, Co-ordinator.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK5MS	24	301	VK6KW	4	211
VK6RU	2	295	VK3WL	14	211
VK5AB	45	290	VK3ATN	26	204
VK6MK	43	284	VK4HR	12	192
VK3AHO	51	277	VK2JZ	61	190
VK4FJ	21	261	VK4RW	23	186

Amendment:
VK3TL 62 128

C.W.

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK3KB	10	316	VK2AGH	71	252
VK3CX	26	301	VK3RP	56	229
VK4FJ	29	286	VK3ARX	66	229
VK2QL	5	279	VK3FH	15	226
VK3NC	19	266	VK3BZ	6	222
VK6RU	18	256	VK5RX	23	220

Amendments:
VK2EO 2 209 VK3TL 78 149

OPEN

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK6RU	8	303	VK3HG	3	269
VK2ACX	6	300	VK3NC	77	269
VK4FJ	32	295	VK3JA	43	252
VK6MK	74	286	VK4HR	7	233
VK2AGH	83	286	VK3BZ	4	231
VK3AHO	76	280	VK3WL	45	225

Amendment:
VK3TL 85 182

MORE ABOUT CRYSTALS AND CRYSTAL FILTERS

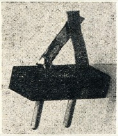
ARIE BLES,* VK2AVA

EARLIER in 1963 I wrote some articles on FT241A low frequency crystals and high frequency filters using type FT243 crystals. In the course of several months of matching and adjusting crystals and filters, I have learned a few things worth mentioning.

FT241A TYPE CRYSTALS

If you have tried to either edge-grind them or silver-plate them for raising or lowering their frequencies, and have had the bad luck to break one or two of the suspension or contact wires, do not despair and throw that little rock away! In nine out of ten cases you can still fix your crystal to filter or oscillate, provided the little solder dots in the centre of the silver electrodes are still in position.

All you need to do is to find two thin strips of material, brass or tin-plate, to make two 1" long clips and to solder these to the crystal holder's pins. The strips must be flat and parallel, close together to hold the crystal between them, only touching the crystal at the two solder dots with a little pressure. Your crystal will be active again!



FT243 CRYSTALS

Most people do not possess the proper skill to grind these crystals for raising their frequencies. Etching with a saturated ammonium bi-fluoride solution is the easiest way. But if you need to shift the frequency more than say 100 kilocycles, you may already have a very transparent slab of crystal with extra smooth surfaces and the etching goes very slowly or stands almost still. Just heat your bi-fluoride solution to say 150 or more degrees (Fahrenheit), but do it in the open for the fluoride fumes are dangerous. The etching effect can thus be speeded up considerably.

What to do when you have gone too far in frequency? Well, if it is going to be a filter crystal, you can still lower the frequency as much as say 500 cycles by changing the pressure on the crystal electrodes in the holder, or by careful reduction of the little corners on the crystal electrodes, using a small honing stone.

If more frequency change is required it will be better to keep the crystal as an oscillator and use a different one for the filter.

More shift in frequency on active oscillator rocks can be achieved by weighting the crystal surfaces. Some use cold solder for that and rub it in. Personally, I prefer to use a soft pencil and rub a little carbon on the crystal. If you have applied too much (when the crystal stops oscillating, or if the frequency has been shifted too much) just wash the crystal in soap and water and start again.

Up to 1,500 to 2,000 cycles shift can sometimes be effected. I have never noticed that the frequency of a treated crystal drifted up again with time. Someone once said that he feared the carbon might be shedded again due to vibration of the crystal!

Of course one can also lower the frequency of a crystal as an oscillator with a parallel capacity across it, but never expect more than 300 to 500 cycles shift in that manner. The crystal will stop oscillating with too much capacity across it.

HYBRID CRYSTAL FILTER CIRCUIT

The impedance of the h.f. crystal filter circuit published in Feb. and August issues of "A.R." is low and either a cathode follower input stage is recommended or some provision must be made to limit the influence of this low impedance loading on the rest of the circuit. In any case, the signal magnitude across a low impedance device is always small.

I have not seen a comment or attempt to overcome this in any magazine, and the solution given in Fig. 1 may really be a novelty.

For 5.5 to 6.0 Mc. operation, the input and output transformers can be made of ¼" diameter t.v.-type i.f. transformer forms. L1 is 45 turns, L2 is 15 turns, both close wound and only little spacing between the two coils. C is a 300/500 pF. mica compression trimmer. L1 is tuned to resonance with the former's iron slug, L2 with C, to give maximum output on the filter centre frequency.

The effect is amazing, the better impedance match between the filter and the high impedances of the input and output sides gives an extra good flat-topped filter passband and loads of signal at the grid of the following stage.

HIGHER FREQUENCY FILTERS

As I was playing with crystals for third overtone oscillator use, I started to wonder whether an active overtone crystal would perhaps also filter on or near that overtone frequency. And it does!

I have made up practical sets of filter crystals on 11 Mc., having a comparable bandwidth and shape factor as the filter sets on half that frequency. There is more work involved and much to be done on this project. Overtone crystals act differently from fundamental frequency ones and more careful adjustment is needed. But it works, and this can be a first example of such use of crystals. ●

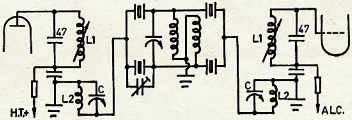


Fig. 1.

* 33 Plateau Road, Springwood, N.S.W.

CORRESPONDENCE:

DIVISION OF 420-450 Mc. BAND

Editor "A.R.,"

Dear Sir,

With the eminent opening of the 420-450 Mc. band to Amateurs, the incentive to undertake some of the less common modes of transmission (particularly t.v. and f.m.) will be greatly increased. To try to cope with the problem of standard frequencies and channels to fit in with possibly existing equipment, I should like to submit the following for consideration by all Amateurs.

(1) The band 420-450 Mc. is wide enough to accommodate four channels, each 7 Mc. wide, for Amateur T.v., but to leave sufficient bandwidth for guard bands and other services, and to fit in with the standard domestic t.v. receiver which would most probably be the common method of reception, only three channels are envisaged.

(2) In considering the domestic t.v. receiver (which would most probably be used as a tuneable i.f. to save modification) note must be taken that the use of the high band channels as the first i.f. would most likely add to the already difficult problem of converter noise at 420 Mc., and therefore the use of the low band is recommended. However, in the low band there are no three adjacent channels which would be the most convenient to use, but as channels 4 and 5 are adjacent, and channel 3 is spaced only 2 Mc. away, it would suggest the use of channels 3, 4 and 5 as the i.f., i.e. from 85 to 108 Mc., and this presupposes the use of a converter with local oscillator injection at 340 Mc.

Now to consider the placement of these bands within the 420-450 Mc. band. As has been seen on the majority of other v.h.f. bands, the majority of serious a.m., c.w. and s.s.b. operating is confined to the lower edges of the band, then it would seem logical to have the three t.v. channels at the top end of the band. Here though rises the problem of a guard band to reduce the possibility of out-of-band operation, and if consideration is given to the many possible d.s.b., i.e. **non vestigal sideband** transmissions which will most likely be undertaken, a minimum guard band of 2 Mc. is suggested.

This now leaves us with the following channeling:—

(1) 420-425 Mc.—a.m., s.s.b., c.w.

(2) 425-432 Mc.—a.t.v. ch. 1 (ch. 3 on t.v. rx).

(3) 432-434 Mc.

(4) 434-441 Mc.—a.t.v. ch. 2 (ch. 4 on t.v. rx).

(5) 441-448 Mc.—a.t.v. ch. 3 (ch. 5 on t.v. rx).

(6) 448-450 Mc.—guard band.

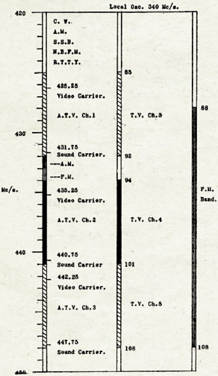
Now two further advantages immediately become obvious.

(a) Using a converter with 340 Mc. injection, the band 428-448 Mc. is converted to 88-108 Mc., i.e. the coverage of a standard f.m. v.h.f. receiver, many of which are still owned by Amateurs, and which are still available in many overseas equipments.

(b) The band 432-434 Mc. which lies between two t.v. channels is exactly three times 144.0 to 144.6 Mc., thus enabling the operators of many 2 metre transmitters to triple directly using existing transmitters and crystals. However, the first 5 Mc. has already been suggested for the more common modes, and therefore it is suggested that only 1 Mc. be available to these modes, e.g. from 432-433 Mc., the remainder from 433-434 Mc. being only for wide-band f.m. as this portion would be covered by the standard f.m. tuner.

In fact another point now arises. Many Amateurs when starting t.v. transmissions will not have the facilities for intercarrier sound, and then these two channels become eminently suitable for use as the accompanying sound channels for t.v. transmission **without** intercarrier sound. Intercarrier sound would normally be available through the standard t.v. receiver.

A further look at the Amateur t.v. position will show that many Amateurs wishing to commence video transmissions will wish to use double sideband



as being the easiest to generate. Therefore, to prevent any interference with any other services the a.t.v. ch. 3 of 441-448 Mc. could be used for double sideband, the unused or lower sideband then falling in the 434-441 Mc. of a.t.v. ch. 2 band. Therefore a.t.v. ch. 1, 425-432 Mc., should be reserved only for vestigal sideband transmissions with intercarrier sound as conforming to P.M.G. and C.C.I.R., and it is suggested that all official transmissions, e.g. W.I.A. etc., take place on this channel.

It is obvious that people wishing to do serious a.m., c.w. and s.s.b. work would build special narrow band converters to feed into their own communications receivers, but for persons wishing to experiment with t.v. the band resolves as follows:—

(1) 420-425 Mc.—a.m., s.s.b., c.w., etc. (narrow band).

(2) 425-432 Mc.—a.t.v. ch. 1, vestigal sideband, intercarrier sound, full C.C.I.R. specs. **only.**

(3) 432-433 Mc.—a.m., sound associated with video transmissions in a.t.v. ch. 2 and 3, non-intercarrier.

(4) 433-434 Mc.—wide band f.m., sound associated with video transmissions in a.t.v. chs. 2 and 3, non-intercarrier.

(5) 434-441 Mc.—a.t.v. ch. 2, vestigal sideband only, intercarrier f.m. sound or non-intercarrier a.m. or f.m. as in (3) and (4).

(6) 441-448 Mc.—a.t.v. ch. 3, vestigal or double sideband video, intercarrier f.m. sound or non-intercarrier a.m. or f.m. as in (3) and (4).

(7) 448-450 Mc.—guard band to prevent out-of-band t.v. signals, but may be used for other narrow band modes if so desired.

These allocations are shown diagrammatically and will assist in an understanding. It would be most opportune if all Amateurs could consider these proposals and advise their local W.I.A. Divisions so that some form of gentleman's agreement may be formulated.

Incidentally, for those interested in building wide band converters with 340 Mc. injection as suggested, quartz crystals on 37.7778 Mc. (one-ninth of 340 Mc.) are being advertised in "Wireless World" by Henry's Radio at 7/6 sterling.

—Douglas W. Rickard, VK2ZDI.

☆

PRINTED CIRCUITS FOR CARS

A British car manufacturer has announced that a new model car they will be producing will use a printed circuit wiring panel behind the dashboard. This will eliminate the familiar wiring harness with its multitude of leads.

☆

NOW REASONABLY WELL

Bill Barber, VK6DX, in a note to the Editor, sends his regards to all Amateurs and mentions that although he has not been in the best of health for the past two years, he is now reasonably well.

FOR THE BEGINNER:

A SIMPLE CONVERTER

WITH the advent of Y.R.C.'s I frequently hear demands for a simple converter. Such a converter has been described for a number of years in the A.R.R.L. Handbook. It is very inexpensive and can be used with practically any broadcast receiver, preferably those without a ferrite antenna stick system. The necessary power outlet could be fitted on a broadcast receiver under the supervision of the Y.R.C. leader and if necessary an aerial terminal.

Why is it inexpensive? The bandsetting for 3.5 Mc. or 7.0 Mc. is by a two-gang capacitor about 365 pF. from any old scrapped radio. Band-tuning by 15 pF. capacitor (two for 7/9 advertised in "A.R."), one valve 6U8, one coil only (for the two bands, no switch). About a dozen resistors and condensers and, of course, the advantage that the bands are bandspread around 100° of the tuning dial.

For those who have not access to a A.R.R.L. Handbook, here is a brief description and circuit.

L1 couples aerial to L2. L2 and L3 form a bandpass circuit that can be tuned by the two gang (C1A and C1B) to 3.5 Mc. or 7.0 Mc. This bandpass circuit is coupled to the pentode section of the 6U8, acting as a mixer. In the anode circuit of the mixer is L6 and C7, tuned to 1700 kc., and L7 is coupled to the broadcast receiver.

L4, L5, C2 and C3, controlled from the panel, forms the main tuning. The oscillator tunes from 5.2 Mc. to 5.7 Mc. (Any Amateur would set this range for intending constructors.) Thus with this range the oscillator is 1700 kc. difference from the signal on 3.5-4.0 Mc. and 1700 kc. difference from 6.9 Mc. to 7.4 Mc. Thus which band appears as an i.f. of 1700 kc. will depend purely on the setting of the two-gang.

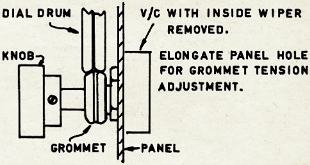
Note: The two-gang capacitor must be insulated from the chassis.

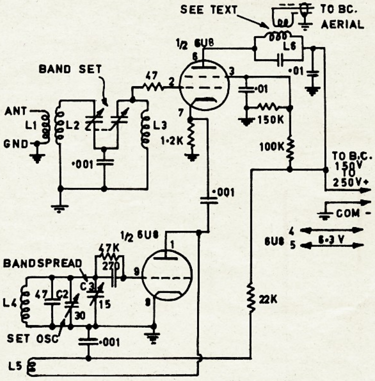
There are only two panel controls, a small knob on the two-gang termed "band set" and a slow motion device labelled "bandspread". If a slow motion dial is not available, a cord drum from a scrapped radio driven by a rubber grommet on a ¼" shaft makes an ideal replacement. A cardboard scale can be glued to the drum and an old volume control with the wiper gear cut away makes a good panel mount for the grommet spindle. A s.a.e. answers any queries or assistance to constructors.

Coil data (all coils 1" diameter):

L1—8 turns 22 s.w.g., ¼" long.
L2—19 turns 22 s.w.g., 19/32" long.
L3—Same as L2.
L4—21 turns 22 s.w.g., 21/32" long.
L5—8 turns 22 s.w.g., ¼" long.

L1 is separated from L2 by 1/32" and wound on the same former. L4 and L5 are separated by 1/32" and wound on same former.





Coils L1 and L2 should be mounted at right angles to L3.

The i.f. coils L6 and L7 can be a variety of arrangements:—

(1) 50-60 turns 28-32 s.w.g., paralleled with a 600 pF. capacitor and coupling winding of 20 turns wound on the cold end; 3/8" diameter slug tuned former.

(2) A r.f. choke of the all-wave type about 4 or 5 pies, and about 20 turns 28-32 s.w.g. wound near the cold end; no parallel capacitor with the choke.

(3) As for (2), but instead of a coupling winding, a 100 pF. condenser from the top or anode end to the b.c. set aerial terminal.

(4) The medium wave oscillator coil from a scrapped radio with a coupling winding of 20-30 turns added, or if a cathode tap of 100 pF. to b.c. set

Whichever course is adopted it must be fitted in a screened box or can, and of course to prevent b.c. break-through the whole should be in a metal box, a half size biscuit tin would make a good enclosure, or one of the aluminium or tin plate baking dishes sold in the multiple stores would do.

—A. F. W. Haddrell, VK3ZFC

(This circuit originally appeared in the A.R.R.L. Handbook.)

AUSTRALIAN DX CENTURY CLUB AWARD

OBJECTS

1.1 This Award was created in order to stimulate interest in working DX in Australia and to give successful applicants some tangible recognition of their achievements.

1.2 This Award, to be known as the "DX Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.

1.3 A certificate of the Award will be issued to the applicants who show proof of having contacted one hundred countries, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

2.1 Verifications are required from one hundred different countries as shown in the Official Countries List.

2.2 The Official Countries List will be published annually in "Amateur Radio" and will be amended from time to time as required. Should a country be deleted from the Countries List at any time, members and intending members will be credited with such country if the date of contact was before such deletion.

2.3 The commencing date for the Award is 1st January 1946. All contacts made on or after this date may be included.

OPERATION

3.1 Contacts must be made in the H.F. Band (Band 7) which extends from 3 to 30 Mc., but such contacts must only be made in the authorised Amateur Bands in Band 7.

3.2 All contacts must be two-way contacts on the same band. Cross band contacts will not be allowed.

3.3 Contacts may be made using any authorised type of emission for the band concerned.

3.4 Credit may only be claimed for contacts with stations using regularly-assigned Government call signs for the country concerned.

3.5 Contacts made with ship or aircraft stations will not be allowed, but land-mobile stations may be claimed provided their specific location at the time of contact is clearly shown on the vertification.

3.6 All stations must be contacted from the same call area by the applicant, although if the call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the details for each claimed station in accordance with the details required in Rule 4.3.

APPLICATIONS

5.1 Applications for membership shall be addressed to the Awards Officer, Box 2611W, G.P.O., Melbourne, Vic., accompanied by the verifications and the check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 2/6, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the D.X.C.C. wishing to have their verified country totals, over and above the one hundred necessary for membership, listed will notify these totals to the Awards Officer.

5.4 In all cases of dispute, the decision of the Awards Officer and two members of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

WORKED ALL VK CALL AREAS (W.A.V.K.C.A.) AWARD

OBJECTS

1.1 This Award, to be known as the W.A.V.K.C.A. Award, is offered by the Wireless Institute of Australia as tangible evidence of the proficiency of overseas Amateurs in making contacts with the various call areas of the Commonwealth of Australia.

1.2 The Award may be claimed by any Amateur in the world who is a member of an affiliated Society of the I.A.R.U., but no Australian Amateur will be eligible.

REQUIREMENTS

2.1 A handsome Certificate will be awarded to any applicant who makes contacts with Australian Amateur Stations in the areas shown in the attached Appendix. The number of contacts required in each area is also shown.

2.2 In the case of applications prior to 1st January, 1964, a total of three (3) confirmations will suffice for call areas VK1 and VK2; thereafter one confirmation for Australian Capital Territory (VK1) will be necessary as shown in the Appendix.

OPERATION

3.1 Contacts between overseas stations and Australian stations must have been made on or after the 1st January, 1946.

3.2 Contacts may be made using any authorised frequency band or type of emission permitted to Australian Amateurs, but cross band contacts will not be allowed.

3.3 No contacts made with ship or aircraft stations in Australian territories will be eligible, but land-mobile or portable stations may be contacted provided the location at the time of contact is shown on the confirmation.

VERIFICATIONS

4.1 The applicant must submit documentary proof, in the form of QSL cards or other written evidence, confirming that two-way contacts have taken place. Such verifications must show the date and time of contact, type of emission and frequency used, signal reports and location (in the case of portable or land-mobile operation) of the stations contacted.

4.2 Verifications must be submitted exactly as received, and forged or altered evidence may result in the disqualification of the station concerned.

4.3 A list, in accordance with the details required in Rule 4.1, must be submitted with the application for the Award.

APPLICATIONS

5.1 All claims for the W.A.V.K.C.A. Award must be made by the submission of the confirmations (Rule 2.1 or 2.2), together with the list (Rule 4.3), direct to "Awards Manager," Box 2611W, G.P.O., Melbourne, Australia. Sufficient International Reply Coupons must be enclosed to cover return postage of the confirmations to the applicant.

5.2 Where a reciprocal agreement exists between the W.I.A. and the applicant's Society, the appointed officer of that Society will carry out the check, and if correct, will forward a written application for the Award on behalf of the applicant, together with the list (Rule 4.3).

5.3 Applications will be examined by the Awards Manager, who will arrange for the Award to be forwarded either direct or through the applicant's Society. The Awards Manager's decision on the application and interpretation of these Rules will be final and binding.

5.4 Notwithstanding anything in the Rules to the contrary, the Federal Council of the W.I.A. reserves the right to amend these Rules as necessary.

APPENDIX

Territory	Call Area	QSLs Required
Australian Antarctica Heard Island Macquarie Island	VK0	1
Australian Capital Territory	VK1	1
Lord Howe Island State of New South Wales	VK2	3
State of Victoria	VK3	3
State of Queensland Thursday Island Willis Island	VK4	3
State of South Australia	VK5	3
State of Western Australia	VK6	3
Flinders Island King Island State of Tasmania	VK7	3
Northern Territory	VK8	1
Admiralty Islands Bougainville Island Christmas Island Cocos Islands Nauru New Britain New Guinea New Ireland Norfolk Island Papua Territory	VK9	1

Note.—In Areas above, where more than one confirmation is required, contacts may be made with any or all of the Territories listed in brackets.

AUSTRALIAN D.X.C.C. COUNTRIES LIST

	Phone	C.W.
AC3 Sikkim		
AC4 Tibet		
AC5 Bhutan		
AP East Pakistan		
AP West Pakistan		
BV (C3) Formosa		
BY (C) China		
C9 Manchuria		
CE Chile		
CE9, KC4, LU-Z, VK0, VP8, ZL5 etc., Antarctica		
CE0A Easter I.		
CE0Z J. Fernandez Arch.		
CM, CO Cuba		
CN2 (prior 1/7/60) Tangier		
CN2, 8, 9 Morocco		
CP Bolivia		
CR4 Cape Verde Is.		
CR5 Portuguese Guinea		
CR5 Principe, Sao Thome		
CR6 Angola		
CR7 Mozambique		
CR8 (prior 1/1/62) Goa		
CR8 Port. Timor		
CR9 Macao		
CT1 Portugal		
CT2 Azores		
CT3 Madeira Is.		
CX Uruguay		
DJ, DL, DM Germany		
DU Philippine Is.		
EA Spain		
EA6 Balearic Is.		
EA8 Canary Is.		
EA9 Ifni		
EA9 Rio de Oro		
EA9 Spanish Morocco		
EA0 Spanish Guinea		
EI Rep. of Ireland		
EL Liberia		
EP, EQ Iran		
ET2 (prior 14/11/62) Eritrea		
ET2, 3 Ethiopia		
F France		
FB8 A'dam & St. Paul Is.		
FB8 Kerguelen Is.		
FC Corsica		
*FF8 French West Africa		
TU2 (fr. 7/8/60) Ivory Coast R.		
TY2 (fr. 1/8/60) Dahomey Rep.		
TZ2 (from 20/6/60) Mali Rep.		
XT2 (from 5/8/60) Voltaic Rep.		
5U7 (from 3/8/60) Niger Rep.		
5T5 (from 20/6/60) Mauritania		
6W8 (fr. 20/6/60) Senegal Rep.		
FG7 Guadeloupe		
FH8 Comoro Is.		
FI8 (pr'r 20/7/55) Fr. Indo China		

	Phone	C.W.
FK8 New Caledonia		
FL8 Fr. Somaliland		
FM7 Martinique		
FN (prior 1/11/54) French India		
FO8 Clipperton I.		
FO8 Fr. Oceania		
FP8 St. Pierre & Miq. Is.		
*FQ8 Fr. Equatorial Africa		
TL8 (fr. 13/8/60) Cen. Afric. R.		
TN8 (from 15/8/60) Congo Rep.		
TR8 (from 17/8/60) Gabon Rep.		
TT8 (from 11/8/60) Chad Rep.		
FR7 (from 25/6/60) Glorioso I.		
FR7 (from 25/6/60) Juan de Nova and Europa Is.		
FR7 Reunion I.		
FR7 Tromelin Is.		
FS7 Saint Martin		
FU8, YJ1 New Hebrides		
FW8 Wallis & Futuna Is.		
FY7 Fr. Guiana & Inini		
G England		
GC Guernsey and Deps.		
GC Jersey I.		
GD Isle of Man		
GI Northern Ireland		
GM Scotland		
GW Wales		
HA Hungary		
HB Switzerland		
HC Ecuador		
HC8 Galapagos Is.		
HE Liechtenstein		
HH Haiti		
HI Dominican Rep.		
HK Colombia		
HK0 Arch. of San Andres and Providencia		
HK0 Bajo Nuevo		
HK0 Malpelo Is.		
HL, HM, 6N5 Korea		
HP Panama		
HR Honduras		
HS Thailand		
HV Vatican		
HZ Saudi Arabia		
I1, IT1 Italy		
I1 (prior 1/4/57) Trieste		
I5 (prior 1/7/60) It. Somaliland		
IS1 Sardinia		
JA, KA Japan		
JT1 Mongolia		
JY Jordan		
JZ0 (pr'r 1/5/63) W. New Guinea		
K, W U.S.A.		
KA0, KG6I Bonin & Volcano Is.		
KB6 Baker, Howland and Am. Phoenix I. (inc. Canton I.)		

*Fr. West Africa and Fr. Equatorial Africa: Only contacts dated prior to when the particular area obtained separate listing (as shown) will count.

	Phone	C.W.
KC4 Navassa I.		
KC6 Eastern Caroline Is.		
KC6 Western Caroline Is.		
KG4 Guantanamo Bay		
KG6 Guam		
KG6 Marcus I.		
KG6 (Rota, Tinian, Saipan, etc.) Mariana Is.		
KH6 Hawaiian Is.		
KH6 Kure I.		
KJ6 Johnston I.		
KL7 Alaska		
KM6 Midway Is.		
KP4 Puerto Rico		
KP6 Palmyra Group, Jarvis I.		
KR6 Ryukyu Is.		
KS4B Serrana Bank and Roncador Cay		
KS4 Swan Is.		
KS6 American Samoa		
KV4 Virgin Is.		
KW6 Wake I.		
KX6 Marshall Is.		
KZ5 Canal Zone		
LA Bouvet I.		
LA Jan Mayen		
LA Norway		
LA Svalbard		
LU Argentina		
LX Luxembourg		
LZ Bulgaria		
MP4 Bahrein		
MP4 Qatar		
MP4 Trucial Oman		
OA Peru		
OD5 Lebanon		
OE Austria		
OH Finland		
OH0 Aland Is.		
OK Czechoslovakia		
ON4 Belgium		
OX, KG1 Greenland		
OY Faeroes		
OZ Denmark		
PA0, PI1 Netherlands		
PJ Neth. West Indies		
PJ2M Sint Maarten		
PK (from 1/5/63) Indonesia		
PK1, 2, 3 (prior 1/5/63) Java		
PK4 (prior 1/5/63) Sumatra		
PK5 (prior 1/5/63) Borneo		
PK6 (prior 1/5/63) Celebes and Molucca Is.		
PX Andorra		
PY Brazil		
PY0 Fernando de Noronha		
PY0 Trindade & Martin Vaz Is.		
PZ1 Netherlands Guiana		
SD1 (ZS7) Swaziland		
SL, SM Sweden		
SP Poland		

	Phone	C.W.
ST2 Sudan		
SU Egypt		
SV Crete		
SV Dodecanese		
SV Greece		
TA Turkey		
TF Iceland		
TG Guatemala		
TI Costa Rica		
TI9 Cocos I.		
TJ (FE8) Cameroon Rep.		
TL, TN, TR, TT (see after FQ8)		
TS (3V8) Tunisia		
TU, TY, TZ (see after FF8)		
UA1-6, UN1 Eur. R.S.F.S.R.		
UA1 Franz Josef Land		
UA2 Kaliningrad Region		
UA9, 0 Asiatic R.S.F.S.R.		
UA0 (prior 1/9/60) Wrangel I.		
UB5 Ukraine		
UC2 White Russian S.S.R.		
UD6 Azerbaijan		
UF6 Georgia		
UG6 Armenia		
UH8 Turkoman		
UI8 Uzbek		
UJ8 Tadzhik		
UL7 Kazakh		
UM8 Kirghiz		
UN1 (prior 1/7/60) Kar-Fin.Rep.		
UO5 Moldavia		
UP2 Lithuania		
UQ2 Latvia		
UR2 Estonia		
VE, VO Canada		
VK Australia		
VK2 Lord Howe Is.		
VK4 Willis Is.		
VK9 Christmas I.		
VK9 Cocos Is.		
VK9 Nauru I.		
VK9 Norfolk I.		
VK9 Papua Terr.		
VK9 Terr. of New Guinea		
VK0 Heard I.		
VK0 Macquarie I.		
VO (prior 1/4/49) Newf./Lab.		
VP1 British Honduras		
‡VP2 (prior 1/6/58) Leeward Is.		
VP2 Anguilla		
VP2 Antigua, Barbuda		
VP2 Br. Virgin Is.		
VP2 Montserrat		
VP2 St. Kitts, Nevis		
‡VP2 (prior 1/6/58) Windw'd Is.		
VP2 Dominica		
VP2 Grenada & Deps.		
VP2 St. Lucia		
VP2 St. Vincent & Deps.		
VP3 British Guiana		
VP4 Trinidad & Tobago		

‡ One contact with each group formerly known as "Leeward Is." and "Windward Is." dated prior to 1/6/58 may be credited, in which case no further credit as a separate listing, as from 1/6/58, will be given those particular islands.

	Phone	C.W.
VP5 Cayman Is.		
VP5 Turks & Caicos Is.		
VP6 Barbados		
VP7 Bahama Is.		
VP8 Falkland Is.		
VP8, LU-Z South Georgia		
VP8, LU-Z South Orkney Is.		
VP8, LU-Z South Sandwich Is.		
VP8, LU-Z, CE9 Sth. Shet. Is.		
VP9 Bermuda Is.		
VQ1 Zanzibar		
VQ2 Northern Rhodesia		
VQ6 (prior 1/7/60) Br. Somalil'd		
VQ8 Cargados Carajos Shs.		
VQ8 Chagos Is.		
VQ8 Mauritius		
VQ8 Rodriguez I.		
VQ9 Aldabra Is.		
VQ9 Seychelles		
VR1 (includ. Canton Is.) British Phoenix Is.		
VR1 Gilbert & Ellice Is. and Ocean I.		
VR2 Fiji Is.		
VR3 Fanning & Christmas Is.		
VR4 Solomon Is.		
VR5 Tonga Is.		
VR6 Pitcairn I.		
VS1 (prior 16/9/63) Singapore		
VS1, 9M2 (from 16/9/63) West Malaysia		
VS4, ZC5 (from 16/9/63) East Malaysia		
VS4 (prior 16/9/63) Sarawak		
VS5 Brunei		
VS6 Hong Kong		
VS9 Aden & Socotra		
VS9 Kamaran Is.		
VS9 Kuria Muria		
VS9 Maldive Is.		
VS9 Sultanate of Oman		
VU2 India		
VU Laccadive Is.		
VU Andaman & Nicobar Is.		
XE, XF Mexico		
XE4 Revilla Gigedo		
XT2 (see after FF8)		
XW8 Laos		
XZ2 Burma		
YA Afghanistan		
YI Irak		
YK Syria		
YN, YN0 Nicaragua		
YO Roumania		
YS Salvador		
YU Yugoslavia		
YV Venezuela		
YV0 Aves I.		
ZA Albania		
ZB1 Malta		
ZB2 Gibraltar		
ZC5 (pr. 16/9/63) Br. Nth. Borneo		
ZC6 Palestine		
ZD3 Gambia		
ZD4 (prior 5/3/57) Gold Coast, Togoland		
ZD6 Nyasaland		
ZD7 St. Helena		
ZD8 Ascension Is.		
ZD9 Tristan da Cunha and Gough I.		
ZE Southern Rhodesia		
ZK1 Cook Is.		
ZK1 Manihiki Is.		
ZK2 Niue		
ZL Chatham Is.		
ZL New Zealand		
ZL1 Kermadec Is.		
ZL4 Auckland and Campbell Is.		
ZM7 Tokelaus		
ZP Paraguay		
ZS1, 2, 4, 5, 6 Rep. of S. Africa		
ZS2 Prince Ed. and Marion I.		
ZS3 South-West Africa		
ZS7 (see SD1)		
ZS8 Basutoland		
ZS9 Bechuanaland		
3A Monaco		
3W8, XV5 Vietnam		
4S7 Ceylon		
4W1 Yemen		
4X4 (from 14/5/48) Israel		
5A Libya		
5B4 Cyprus		
5H3 Tanganyika		
5N2 Nigeria		
5R8 (Madagascar) Malagasy		
5T5 (see after FF8)		
5U7 (see after FF8)		
5V Togo Rep.		
5W1 (ZM6) Samoa		
5X5 (VQ5) Uganda		
5Z4 (VQ4) Kenya		
6N5 (see HL)		
6O1, 6O2 (from 1/7/60) Somalia Rep.		
6W8 (see after FF8)		
6Y (VP5) Jamaica		
7G1 (from 1/10/58) Rp. of Guinea		
7X2 (FA) Algeria		
9A (MI) San Marino		
9G1 (from 5/3/57) Ghana		
9K2 Kuwait		
9K3 Kuwait-Saudi Arabia N.Z.		
9L1 (ZD1) Sierra Leone		
9M2 (prior 16/9/63) Malaya		
9N1 Nepal		
9Q5 (previously OQ5-0) Rep. of The Congo		
9S4 (prior 1/4/57) Saar		
9U5 (from 1/7/60 to 30/6/62) Ruanda-Urundi		
9U5 (from 1/7/62) Rwanda Rep.		
9X5 (from 1/7/62) Burundi		
— Cambodia		

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY CONTEST, 1964

Saturday, 8th February, to Sunday, 9th February

DATE

Saturday, 8th February, to Sunday, 9th February, 1964.

DURATION

From 1600 hours E.A.S.T., 8th February, to 1600 hours E.A.S.T., 9th February, 1964.

OBJECTS

The operators of Portable and Mobile Stations within all VK Call Areas will endeavour to contact other Portable/Mobile and Fixed Stations in Australian and Overseas Call Areas.

RULES

1. There shall be five sections in the Contest:—
   - (a) Portable/Mobile Transmitting, Phone.
   - (b) Portable/Mobile Transmitting, C.w.
   - (c) Portable/Mobile Transmitting, Multiple Operators, Open only.
   - (d) Fixed Transmitting Stations working Portable/Mobile Stations, Open only.
   - (e) Reception of Portable/Mobile Stations.

2. All Australian Amateurs may take part. Mobile or Portable Stations shall be limited to an input of 25 watts to the final stage. This power shall be derived from a self-contained and fully portable source. A Portable/Mobile Station shall not be located within one mile radius from the home(s) of the operator(s), nor be situated in any occupied dwelling or building.

Portable/Mobile Stations may be moved from place to place during the Contest.

No apparatus shall be set up on the site earlier than 24 hours prior to the Contest.

All Amateur bands may be used, but no cross-band operating is permitted.

3. Amateurs may enter for either (a) or (b), or both, in the Portable/Mobile sections.

4. One contact per station for phone and one for c.w. per band is permitted.

5. Entrants must operate within the terms of their licences and in particular observe the regulations with regard to portable operation.

6. Serial numbers consisting of RS or RST report plus three figures commencing with 001 and increasing by one for each successive contact shall be exchanged.

6a. Entrants in Section (c) for Multiple Operator Stations can set up separate transmitters to work on different bands at the same time. All such units of a Multiple Operator Station must be located within an area that can be encompassed by a circle not greater than half a mile diameter.

For each transmitter of a Multiple Operator Station a separate log shall be kept with serial numbers starting from 001 and increasing by one for each successive contact. All logs of a Multiple Operator Station shall be submitted by the Operator under whose Call Sign the transmitters are working. No two transmitters of a Multiple Operator Station are permitted to operate on the same band at any time.

7. **Scoring:—**

(a) **Portable/Mobile Stations:**

For contacts with Portable/Mobile Stations outside entrant's Call Area .. .. **15 points**

For contacts with Portable/Mobile Stations within entrant's Call Area .. .. **10 points**

For contacts with Fixed Stations outside the entrant's Call Area .... **5 points**

For contacts with Fixed Stations within the entrant's Call Area .... **2 points**

(b) **Fixed Stations:**

For contacts with Portable/Mobile Stations outside entrant's Call Area .... **15 points**

For contacts with Portable/Mobile Stations within entrant's Call Area .. .. **10 points**

8. The following shall constitute Call Areas: VK1 and VK2 combined, VK3, VK4, VK5 and VK8 combined, VK6, VK7, VK9 and VK0.

9. All **logs** shall be set out under the following headings: Date/Time (E.A.S.T.), Band, Emission, Call Sign, RST/No. Sent, RST/No. Received, Points Claimed. Contacts must be listed in numerical order.

In addition, there shall be a front sheet showing the following information:—

Name.............................Address.................
Call Sign........................Section..................
Call Sign of other operator(s) (if any)....
Location of Portable/Mobile Station......
From ....hours to ....hours
From ....hours to ....hours

A brief description of equipment used, bands used and points claimed, followed by the declaration:

"I hereby certify that I have operated in accordance with the rules and spirit of the Contest."

Signed............................ Date...............

10. The right is reserved to disqualify any entrant who, during the Contest, has not observed the Regulations and the Rules of this Contest or who has consistently departed from the accepted code of operating ethics.

11. The decision of the Federal Contest Committee of the Wireless Institute of Australia is final and no disputes will be entered into.

12. Certificates will be awarded to the highest scorer in each Call Area. Additional Certificates may be issued at the discretion of the F.C.C.

13. **Return of Logs:—**

All entries must be postmarked not later than the 8th March, 1964, and addressed to the—

Federal Contest Committee, W.I.A.,
Box 638J, G.P.O.,
Brisbane, Queensland.

RECEIVING SECTION

14. This section is open to all Short Wave Listeners in VK Call Areas. The Rules shall be the same as for the Transmitting Stations. Logs shall take the same form as for Transmitting Stations, but will omit the serial number received.

Logs must show the Call Sign of the Station heard, the serial number sent by it, and the Call Sign of the Station being worked.

Only one lot of points can be claimed for any one contact between two stations, for example: VK2AA/P calling VK3XX/P and exchanging numbers. Points can be claimed only for VK-2AA/P working VK3XX/P. **No** points can be claimed for VK3XX/P working VK2AA/P during this particular contact.

Scoring will be on the same basis as for Transmitting Stations. It will not be sufficient to log a station calling CQ. A station may be logged once only for phone and once for c.w. in each band.

Awards.—Certificates will be awarded for the highest scorer in each Call Area.

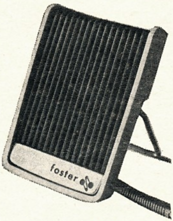
FOSTER DYNAMIC MICROPHONES

FOR HAND-DESK USE

SPECIFICATIONS:

Output Impedance .... 50 ohms or 50K ohms
Effective output level .... —55 db. [0 db. = (one) 1V. Microbar]
Frequency response .... 200 to 10,000 c.p.s.

OMNI-DIRECTIONAL DYNAMIC:



DF-2

SIZE: 3" x 2-1/8" x 1".
Cable: 5 ft. of P.V.C.
Switch: on-off.
Desk Stand. Clip folds for hand use.
Colour: WHITE.
Plastic Diaphragm.

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Recent Trends in Receiver Front-End Design*

Noise Figure and Cross Modulation Characteristics of Tube and Transistor Front Ends

E. A. ANDRADE, W0DAN

EARLIER "QST" articles,[1, 2, 3] have painted a fairly comprehensive picture of the performance to expect of a modern high-quality communications receiver. Superheterodyne front-end performance has certainly come a long way from the days of the National FB-7 (a very advanced receiver for its day, indeed!), with its two 20 metre bands 910 Kc. apart, to the modern double-conversion crystal controlled s.s.b. receiver.

Two recent trends in receiver design, the band-passed front end and the transistor front end, will be discussed in this article. Means of minimising some of the problems will also be discussed.

Before proceeding, it might be well to review the requirements for a good communications receiver r.f. section.

• Building a receiver for immunity to cross-modulation calls for compromising on other desirable features. Here is a discussion of receiver front-end design that the man who makes his own can't afford to miss.

SENSITIVITY

The receiver must have enough amplification to make the weakest signals audible in the loudspeaker. Such amplification is fairly easy to attain in the modern superheterodyne, where gain may be obtained at several different frequencies. The gain can be relatively low at any one of the frequencies, so gain stability is not a serious problem. The gain from antenna to loudspeaker in a typical communications receiver may be as high as 10 million.

However, all this gain will not allow the operator to copy a weak DX signal unless the signal-to-noise ratio is adequate. This means that the noise contributed by antenna coupling circuits, r.f. amplifiers and mixers must be held to a minimum.

The best way to express receiver sensitivity is either in terms of signal-to-noise ratio or—even better—in terms of noise figure.

It is generally agreed that in the h.f. spectrum (2 to 30 Mc.) a noise figure of 6 to 7 db. is all the sensitivity that can be used because of the masking effects of antenna noise, provided that a matched antenna system is used. In our discussion we will consider this sensitivity adequate. For a further discussion of noise figure, see references 1 and 2.

CROSS-MODULATION

Unfortunately, adequate gain and sensitivity are not the entire story in a communications receiver. An often neglected area of front-end design is its performance in the presence of strong signals out of the pass-band.

If we are listening to a weak DX signal with an S meter reading of, say, S2 and a strong local comes on the air, perhaps 50 Kc. removed from our DX station's frequency, the modulation of the undesired signal may appear on the weaker signal. This effect is known as cross-modulation. In the case of single-sideband signals, the splatter that you have been blaming on the other fellow's signal could be generated in your own receiver by its cross-modulation.

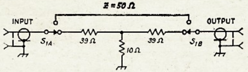


Fig. 1.—Circuit of 20 db. "T" pad for insertion in coaxial line. Values given are for 50-ohm line. Resistors are ½ watt composition. S1 is a d.p.d.t. toggle switch. Coax connectors may be any type.

Another effect, closely related to cross-modulation, is desensitication, or blocking. This occurs when a strong off-channel signal actually drives the r.f. amplifier or a mixer into grid current so the tube biases itself toward cutoff. Generally, if the cross-modulation capabilities of a receiver are adequate there is no trouble from blocking effects.

Cross-modulation performance of a receiver is usually plotted for a fixed level of desired signal in the passband against various levels of undesired signal that cause cross-modulation 10 db. below the desired signal audio level.

If you suspect that your receiver is cross-modulating, an easy check may be made by inserting a 20-db. pad between the receiver and the antenna. The desired signal is usually strong enough so that it may still be he heard. However, if the interfering signal is the result of receiver cross-modulation, it will disappear when the pad is inserted. Fig. 1 gives the circuit and values for a 20-db. pad. The pad should be shielded to prevent stray pickup, and the construction should be such as to minimise capacitive coupling between the input and output connectors.

THE BAND-PASSED FRONT END

A considerable simplification in the tuning mechanism of a multiple conversion receiver may be accomplished by replacing all signal-frequency tuned i.f. circuits with suitable broad-band transformers. usually designed just to accommodate one Ham band. The receiver band switch then selects the proper transformer for the desired band. The reduction in mechanical complexity is certainly very attractive, particularly to the home constructor. Unfortunately, a serious penalty in cross-modulation performance, and to a degree sensitivity, is incurred.

Cure D in Fig. 2 shows the cross-modulation of a typical commercial receiver having a broad-band front end, compared to one (Collins 75A-4) which uses two tuned circuits at r.f., Curve B. The curves were taken with a 5 μV. desired signal, both the desired and undesired signals being fed to the 50 ohm receiver input. For undesired signal levels of 0.1 to 1.0 volt, the cross-modulation occurs essentially in the r.f. amplifier tube of a tuned receiver. In a broad-banded receiver it usually occurs in the first or second mixer. Cross-modulation of undesired signal levels below 0.1 volt generally occurs in the mixer stages, in a tuned receiver, unless extremely low r.f. amplifier gain and very high antenna-coil gain are used. The noise figure of the broad-band receiver was considerably poorer than the 75A-4, as a result of a compromise in antenna-coil gain in order to minimise cross-modulation as much as possible.

The poorer performance of band-pass circuits would be most noticeable on the three lower-frequency bands, 3.5, 7 and 14 Mc. As the signal frequency is increased, the effective selectivity of

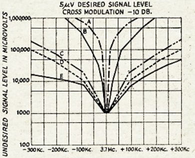


Fig. 2.—Cross-modulation characteristics of various types of receiver front ends. The curves show the undesired-signal input, as a function of frequency, required to produce cross-modulation 10 db. below the output from a 5 microvolt desired signal on 3.7 Mc.

A—Tuned r.f. amplifier using a 6386 tube.
B—Collins 75A-4.
C—Broad-band r.f. amplifier using 6386.
D—Commercial broad-band receiver.
E—Transistor front end.

* Reprinted from "QST," June, 1962.

1. Goodman, "How Sensitive is Your Receiver?" "QST," September 1947.
2. Pappenfus, "A Discussion of Receiver Performance," "QST," January 1955.
3. Pappenfus & Andrade, "Modifying 75A-2 and 75A-3 Receivers," "QST," July 1955.

the simple r.f. tuned circuits decreases. At 30 Mc., with an operating Q of 40 in each tuned circuit, the 6-db. response points with two tuned circuits would be 1.4 Mc. apart. Thus at this frequency there is very little choice between the band-pass characteristics of the usual two-tuned-circuit r.f. amplifier and mixer, or the band-passed system.

Let's say that in spite of the problems outlined above, we've decided to build that "dream receiver" with broad-band r.f. circuits, in the interests of simplified home construction. What can we do to minimise the problems? Cross-modulation is caused by two factors: lack of selectivity, and insuffcient dynamic range in the r.f. amplifier and mixer tubes. We have sacrificed front end selectivity for broad-band r.f. circuits, but if we are able to find some tubes with a very low equivalent-noise resistance, we can use low antenna-coil and r.f.-amplifier gain. This would have the same effect as increasing the dynamic range of the tubes, thereby allowing us to handle stronger undesired signal levels than previously. While the same approach applied to a tuned receiver would provide outstanding strong-signal performance, a fairly acceptable band-pass receiver could be built.

still realise a 6.5 db. over-all noise figure. To accomplish similar sensitivity with the 6BA7 as a mixer would require an r.f. stage gain of nearly 25. This would result in severe degradation of mixer cross-modulation performance because of the very high levels of undesired signal that would appear at the mixer grid.

By using no more antenna-coil gain than is necessary to provide our 6.5 db. noise figure, we keep undesired signal levels relatively low at the r.f. amplifier grid. The 6386 equivalent noise resistance under these operating conditions is 750 ohms, including the effect of first-mixer noise. An antenna-coil voltage gain of 5 will satisfy the noise-figure requirements.

The broad-band version of this front end has not been breadboarded to date. However, the tuned-version cross-modulation is shown in Fig. 2, curve A. A projected curve, C, based upon the gains and known cross-modulation levels in the tuned circuit, indicates the performance to be expected with broad-banding.

A word of caution is necessary converning the injection signal for the triode mixer. To fully realise its low noise resistance, it is quite necessary to have a low-noise injection system as well as a source impedance of 50 ohms

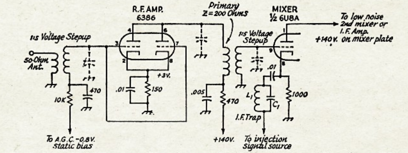


Fig. 3.—Low-noise triode r.f. amplifier-mixer circuit with good cross-modualtion characteristics. Resistors are ½ watt composition. L1C1 is a trap circuit tuned to the i.f. output frequency of the mixer. See text for adjustment of interstage transformers.

Fig. 3 shows a rough schematic of such a front end. A 6386 remote-cutoff dual triode, with both sections in parallel, was selected for the r.f. amplifier. The plate load for the 6386 is very low, about 200 ohms. This keeps the voltage gain between the grid and plate less than unity, and no neutralisation of the r.f .stage is necessary. Voltage gain to the mixer is obtained in the broad-band coupling transformer. A transformer voltage gain of 5, combined with a tube voltage gain of 0.8, provides an over-all r.f. stage gain of 4, which is adequate to overcome the mixer noise.

When setting up the transformer, adjust primary turns and coupling for a voltage gain of 0.8 from grid to plate of the 6386. Then re-check the secondary voltage to make sure there is a gain of 5 in the transformer.

The mixer is the triode half of a 6U8 or one section of a 12AT7, with cathode injection. These tubes used as mixers have an equivalent noise resistance of about 2,000 ohms, compared with 60,000 ohms in a pentagrid mixer such as a 6BA7. It is this low mixer noise resistance that allows us to use a total r.f. stage gain of only 4 and

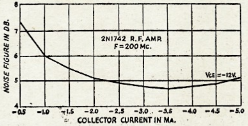
or less. The most troublesome noise injection sources is generally the white noise occuring at intermediate frequency. In most cases a parallel-tuned i.f. trap, inserted in the lead to the mixer cathode, is sufficient to reduce this noise to an acceptable level (L1C1 in Fig. 3). If a variable i.f. is used following the first mixer, it may be necessary to substiute a high-pass filter with a cutoff frequency below the lowest injection frequency.

A simple way of checking source impedance is to connect the r.f. probe of a v.t.v.m. across the unloaded output circuit of the injection oscillator. Then try different values of resistance across

★

Fig. 4.—Typical curve of noise figure vs. collector current for a 2N1742 transistor as an r.f. amplifier, at 200 Mc.

★



the output circuit, looking for the oscillator voltage to drop to one-half its unloaded value. The resistor value that causes this to happen is equal to the source impedance of the oscillator.

THE TRANSISTOR FRONT END

Certainly a general article on receiver design these days should include a discussion of transistorised circuitry. Unfortunately, although it is fairly easy to obtain excellent sensitivity with the newest r.f. transistors, there is a severe limitation on strong-signal performance. In fact, unless a very severe reduction in sensitivity is accepted, a transistor front end may be expected to cross-modulate with 20 to 30 db. less undesired signal than an equivalent tube receiver. A typical transistor receiver cross-modulation curve is shown in curve E, Fig. 1.

Text books tell us that there is no significant difference in the noise figure of a given transistor in any of the three amplifier configurations: common base, common emitter, and common collector. This has been pretty well confirmed in practice as well as theory.

It is now possible to attain a transistor noise figure of 4 db. as high in frequency as 200 Mc., with transistors in the three- to five-dollar class, thus making a 7-db. noise figure in the 3 to 30 Mc. range a relatively easy job. It should also be possible to design some excellent 6 and 2 metre portable equipment using these types. Some transistors that will do this job are the Philco types 2N1742, T2042, and T2028; Texas Instrument types 2N2189 and 2N2191, and the Amperex Universal type 2N2084.

In order to realise the best noise figure capabilities of an r.f. transistor, careful attention must be paid to both the recommended collector current for minimum noise figure and the recommended source impedance. The source impedance for minimum noise figure is generally near the value of the input impedance of the transistor in the **common-emitter configuration.** This value does not change significantly when the transistor is used in the other amplifier configurations. Fig. 4 shows how collector current and noise figure of the Philco 2N1742 are related.

Fig. 5 is a schematic of a typical common-emitter r.f. stage and mixer stage using the 2N1742 and 2N1743. The r.f. stage available power gain is partly a function of frequency, and varies from 45 db. at 3 Mc. to 35 db. at 30 Mc. A noise figure of 7 db. is attainable if the coil tap to the transistor is set to match the input impedance of the transistor. A collector current of 3.5 mA. corresponds to the recommended value for minimum noise figure, and is adjusted by selecting the

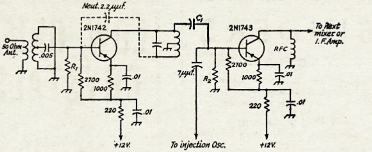


Fig. 5.—Transistor r.f. amplifier and mixer circuit. Capacitances are in μF. except as indicated; resistances are in ohms; resistors are ½ watt. See text for adjustment of antenna coil tap. Interstage coil centre-tapped.

C1—Selected for desired r.f. stage gain; typically 7 pF.
R1—Approximately 12,000 ohms; adjust for 3.5 mA. collector current.
R2—Approximately 18,000 ohms; adjust for 1.0 mA. collector current.

proper value for R1 (approximately 12,000 ohms).

Fig. 6 is a plot of input capacitance and input impedance vs. frequency, for various values of collector current, for the 2N1742. If the 2N1742 is used in the 3-30 Mc. frequency range, neutralisation will probably not be necessary. However, if it is used at higher frequencies than 30 Mc., it would be desirable to add the network shown dotted in Fig. 5, to realise the maximum power gain and minimum noise figure.

CROSS-MODULATION IN TRANSISTOR R.F. STAGES

As stated previously, cross-modulation is a serious problem in transistorised receivers. R.f. transistors have an inherently limited dynamic range and will cross-modulate with some 20 to

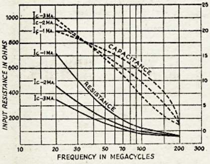


Fig. 6.—Typical equivalent parallel input resistance and capacitance, 2N1742 with Vce equals —10 volts, for selected values of collector current, output short-circuited.

30 db. less signal than a tube stage. Although to date no one has come up with a good answer to the problem, there are a few design tricks that help to minimise it.

The most simple device to minimise cross-modulation would be a 20-db. attenuator with a switch to connect it between the antenna and the receiver input stage when a strong off-channel signal is cross-modulating. Perhaps this sounds a bit agricultural, but it works, provided the desired signal is strong enough to overcome the 20-db. loss. Admittedly, this ruins the noise figure of the receiver, but there's not much point in having a 6 or 7 db. noise figure when a strong local is wiping out the whole band.

A more exotic way of improving the r.f.-stage cross-modulation would be to improve the r.f. selectivity by using two or even three tuned circuits ahead of the r.f. transistor. Noise figure would suffer to a degree, but this is a compromise that the receiver designer is frequently required to make, even in a tube receiver.

Another means of improving the cross-modulation is to introduce degeneration in the emitter lead of a common-emitter r.f. stage. Caution must be exercised to assure that no more than 3 or 4 db. of degeneration is used, or the noise figure will deteriorate excessively. Other negative feedback schemes have been considered, but stability becomes a problem if any great amount of r.f. feedback is used.

TRANSISTOR MIXERS

A transistor used as a mixer will generally provide about 3 db. less gain than the same transistor operated as an r.f. amplifier. This is considerably different from tubes, where the conversion gain is approximately 25 per cent. of the tube's gain as an amplifier. R.f. gain in transistor front ends must be held to the minimum consistent with the desired noise figure, just as in a tube r.f. section; otherwise, mixer cross-modulation will become excessive.

A 10 to 12 db. mixer noise figure is fairly common for transistor mixers such as Philco 2N1743. In order to realise this noise figure, careful attention must be paid the recommended collector current and oscillator injection power requirements for the particular transistor being used. Fig. 7 shows the effect of collector current on noise figure, and Fig. 8 shows oscillator injection power vs. mixer gain.

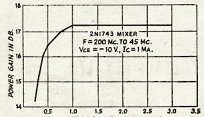


Fig. 7.—Gain vs. oscillator injection power, 2N1743 as a mixer with Vce equals —10 volts, Ic equals 1 mA. This curve applies over the frequency range 45-200 Mc.

The formula for computing the effect of mixer noise figure on r.f. stage noise figure is

$$\text{Noise figure (power ratio) Fab} = \text{Fa} + \frac{\text{Fb} - 1}{\text{A}}$$

where Fab is the total noise figure, Fa is the noise figure of the r.f. amplifier, and Fb is the noise figure of the mixer. These are expressed as power ratios. To get the noise figure in db., take 10 times the $\log_{10}$ of the power ratio. A is the power-gain ratio of the r.f. stage including all coupling losses between stages. A numerical example is given below:

Fa = 4 db.; power ratio = 2.5
Fb = 10 db.; power ratio = 10
A = 10 db.; power ratio = 10

$$\text{Therefore, Fab} = 2.5 + \frac{10 - 1}{10}$$

$$= 2.5 + \frac{9}{10} = 3.4$$

$$10 \times \log_{10} \text{ of } 3.4 = 5.3$$

$$\text{Fab} = 5.3 \text{ db.}$$

The noise figure (5.3 db.) is now referenced from the base of the r.f. amplifier transistor. Antenna-coupling circuit losses must also be considered in determining the over-all noise figure of the receiver. Although it is possible

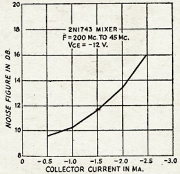


Fig. 8.—Noise figure vs. collector current, 2N1743 as a mixer, 45 to 200 Mc.

to compute the over-all noise figure including the antenna-coil tuned-circuit losses, it becomes somewhat involved because three variables affect it. These are the losses inherent in the tuned circuit (Q), losses due to mismatching, and the effect on transistor noise figure with change in source impedance. The computation of this is somewhat beyond the scope of this article. However, a good approximation may be made by setting the transistor tap on the input coil to match the input impedance of the transistor, measuring noise figure, and then moving the tap as close to the ground end of the coil as you can get, while still maintaining a 7 db. noise figure. This will keep signal levels to the r.f. stages as low as possible, thereby minimising cross-modulation.

Needless to say, it is very desirable to use as high a tuned-circuit coil Q

(Continued on Page 21)

W.I.A. N.S.W. DIVISION
15th Annual Convention

A FIELD DAY

will be held at
VK2WI
Quarry Road, Dural
on
SUNDAY, 26th JAN., 1964

Transmitter Hunts, Mobile Efficiency Test, Disposals, Competitions, QSL Bureau and Demonstrations.

Registration 10/-
XYL and Harmonics Free

FREQUENCY MARKER WITH 50 Kc. INTERVALS

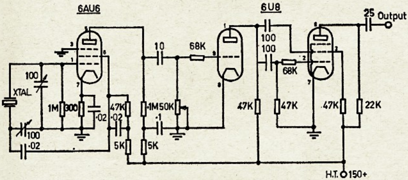
SOME of the luckier Amateurs have equipment with 100 Kc. calibrators built in and for them band-edge spotting is no problem, except where again is 7150, 14350 or 21450 kc.?

In looking up some information recently on frequency sub-dividers, multi-vibrators, I struck an old "QST" article describing a crystal oscillator locked 50 kc. multi-vibrator, and one evening decided to put it together in a hurry and see how it worked. Well, it works beautifully with a 400 or 500 kc. crystal, which are not so elusive as the 100 kc. rocks, nor so expensive, and because of the square wave output nature of the multi-vibrator, there is plenty of signal down to 10 metres!

Only two tubes are required, a penthode as Pierce crystal oscillator with provisions to adjust the crystal frequency up or down a bit and zero beat it against a frequency standard, and a triode-pentode with a 50K potentiometer to adjust the multi-vibrator frequency and make it lock in with the correct crystal submultiple (don't know a better word!).

Power consumption is very small, so could be taken from the existing receiver. Because of the simplicity of the circuit, no construction details or pictures are given. 400 or 500 kc. crystals can be procured from advertisers in "A.R."

—Arie Bles, VK2AVA.



RECEIVER FRONT-END DESIGN

(Continued from Page 19)

as possible in order to maintain the maximum r.f. selectivity for best cross-modulation performance.

AUTOMATIC GAIN CONTROL

The choice of an a.g.c. system in transistorised r.f. sections may have a considerable effect on cross-modulation characteristics of the receiver. In general, "forward" a.g.c., which reduces transistor stage gain by lowering the emitter to collector voltage, will provide better cross-modulation performance than the conventional "reverse" a.g.c., which controls gain by varying the base bias to reduce collector current in a manner similar to the bias control used with remote-cut-off pentodes.

Even better results can be obtained with a.g.c. systems where the control-led element is separate from the transistor stage. An example of this would be some form of a bridge or "T" network using a voltage variable capacitor, controlled by a.g.c. voltage.

CONCLUSION

As our technology expands, new tools for accomplishing our radio communication jobs are evolved. They are not always a direct advance in the state of the art, but must be considered carefully in the light of existing requirements.

In the case of the broad-band circuits discussed in this article, we have a definite step backward in cross-modulation and blocking capability. Modifying circumstances such as the need for light weight, portability, low power drain, low cost, or mechanical simplification may be worth the sacrifice in performance that accompanies the use of these design techniques. ●

— . . . —

GELOSO TRANSMITTER

(Continued from Page 3)

prodding and wriggling the net switch can be dismantled and the extra wafer installed without removing any wires.

This new wafer is wired in such a way that the bleed resistor circuit is made in the a.m. and c.w. positions, but is opened on net.

The mounting of the relay is a matter of individual choice, but I found that by bending the vertical shield between the v.f.o. and final amplifier sections over at an angle of 45°, a small shelf was made on which the relay could be mounted in a position where all wires would reach without being cut or extended. Power for the relay will, of course, depend on the type. Mine is an industrial type with 230v. coil which is triggered by an extremely small single pole relay with a very high resistance coil operated from the in-built bias supply.

At first sight it may appear necessary to replace the 33 ohm resistor with a heavier one, but mine has been operating for nearly a year now without ill effect.

There is nothing very complex about these modifications. They do, however, make what is already a very efficient transmitter even more convenient to operate. ●

D X

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35 Whynot Street, West End, Brisbane, Qld.
ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

At the time of writing this, the "CQ" Contest has just run its course. The 21 Mc. band was alive from before dawn, until after dark. All continents except South Africa were heard. A few minutes after QRT time, the band had lapsed to its almost silent self, proving that it is lack of activity, not conditions entirely, that cause the higher frequency bands to seem so lifeless.

NOTES ANW NEWS

VS9HAA, VQ4IN/VS9H is active at the moment. This is the Kuria Muria Expedition in which Gus W4BPD and one or two others are figuring, making it a twenty-four hour affair. Gus' next stop is scheduled to be Sikkim, AC3PT, early in December, so he may possibly be QRT from this spot also by the time this reaches your mail box. (Man, how that fellow gets around.)

HZ2AMS is also creating pile-ups at the moment. Having a little s.s.b. trouble but is usually on 14010 around midnight for the c.w. men. Rather a slow op. QSL via R.S.G.B.

TT8, Tchad Republic, is scheduled to come on the air in December and continue through January. After this it will be TY, TJ8, etc. Op. will be 5N2RSB, who is familiar to many already.

VP8GQ will QRT early in January. So you'd better keep an ear on the low end of 14 Mc. if you still want a QSO. He works 80 and 40 mx as well. QSL via R.S.G.B.

ZD3A reports that he is the only licensed Ham in Gambia. So that makes ZD3AL a pirate. The latter is quite active.

XZ2KN in Burma is on 20 mx c.w. at odd frequencies. Try after 7 p.m. E.A.S.T.

FR7ZD is on 21150 a.m. round 1700z. (This time no good for VK.)

W4VGL/KG6, Marcus Is., on 21 s.s.b. around 0000z and 7G1IX reported on 14002 at 2000z.

Mauritius.—VQ8AI has been reported on 14 Mc. c.w. around 0400z.

Central African Republic.—TL8SW was wkd. on 14 and 21 Mc. c.w. QSL via BP302, Bangui, C.A.R.

Turkey, TA. KV4DE, Howard, will be leaving in a few weeks for Turkey, where he has a job as a school teacher. He plans to take along his DX 100B, SB-10 and Drake 2-B and hopes to be able to operate.

New Hebrides, YJ1.—Rumour has it that Don HL9KH will DX-pedite to this rare one in December and January.

Christmas Island.—The Hammarlund gear will remain on Christmas Is. and will be used at VK9MB, who is supposed to have a better location than VK9DR. W2GHK will handle the QSLs for both VK9DR and VK9MB, to the Hammarlund Box 7388. Other stations reported active on the island are VK9ND, 14105 kc., s.s.b.; VK9MB, high end of 14 Mc. s.s.b.; and the club station, VK9XI.

Malaysia.—VS4FS is active on 14071 kc., xtal controlled, running 15w. Rumour has it that Gus may be in this area after the first of the year. Also VS4IH is active on 14 Mc. c.w.

Oman.—VS9OC has been reported on 14125 kc. around 1900-2000 G.M.T.

Gibraltar.—ZB2A is reactivated on 21054 kc., heard at 1500z.

Amsterdam Island.—FB8ZZ is on nightly. Try 21040 at 1700 G.M.T.

Crozet Island, FB8WW. A crew will attempt to set up a permanent station on this island early January 1964. Probably QRP c.w. and a.m. only. QSLs handled by 5R8BC.

(By courtesy Florida DXer, John K4IIF.)

San Felix, CE0XA. DX-pedition is planned to this spot if W money and necessary transportation can be arranged.

W6TI Bulletins—new sked—Sundays 0500, 1600 and 2100z on 14002 kc. Starting Nov. 0500z will be dropped and bulletins will be beamed to Australia on 7035 Kc. at 0730z.

CE0AD is on 7025-050 around 0000-0200z, c.w. and a.m., 500w.

YA.—K4UTE will leave Jan. 1 for a Peace Corps tour of two years in Afghanistan. He hopes to work from there and neighbouring countries.

Attention, 1.8 Mc. fans! VP8GQ is active on 1801. JAs get 1.8 Mc. privileges early this year. W4WQQ/VP9 will be QRX up there also.

Falklands.—VP8HJ will be on s.s.b. soon, if all goes as planned.

SD7 is the new call for new ZS7 ops.

Manchuria has been deleted from the A.R.R.L. Countries List.

VR6AC.—We regret that Floyd McCoy has joined the "Silent Keys".

(By courtesy of N.C. DXer, Editor WA6TGY.)

Marion Is.—ZS2NI has recently been heard on 7005 kc. at 0500 G.M.T.; also 14058 kc. at 1115 G.M.T. Fridays and Saturdays.

Baker Island.—W4VTL/KB6 operates on 21413 kc. daily around 2200 and 0100 G.M.T.

Togo.—VE3BSB/5V4 is reported to be in operation from Nov. for about four months.

Republic of Guinea.—7G1YX has been reported active on 14002 kc. at 2000z.

South Orkney Islands.—After a memorable reign with a strong signal and activity on all bands, 160-10 mx., VP8GQ will close down in about six weeks time, then will be QRT for about three weeks and will re-appear from the Falklands.

VR1B has been heard from the Pacific area, also FK8AU from New Caledonia can be heard around 14120 kc. on s.s.b.

Gus W4BPD says he will participate in no VK activity; so that's that, except that Gus does change his plans.

VP0, Anguilla.—Unofficial rumour has it that activity by W2s and VP9 could take place at any time from now.

Senegal.—6W8AC is active every week-end 2100-2200 G.M.T.

WA6IVM requests VK contacts on 1990 kc. c.w. from 1200 G.M.T. on Saturdays until the end of March 1964. He is using 200w. and Marconi antenna on that freq. (BERS195, Eric.)

VQ4CH, Geo. Watson, is migrating to Sydney and should reach Melbourne during Dec., by the ship "Canberra". Welcome to VK OM. (BERS195).

Ken VK3TL reports reaching DXCC during the past month. (Who said conditions were bad, hi! Nice work, Ken.—Al.)

John VK5KO comes to light with probably the most informative info. for the month, on conditions, etc. Reports to hand show that John is heard regularly on 160 and 80 mx overseas. Argument can always be waged on such things as Utopian QTHs, but VK5 does seem to be very favourable to Europe on the S. path.

ACTIVITIES

Ken VK3TL, who always gets more than a good share each month, comes to light with the following good ones wkd., 20 mx phone, mostly s.s.b.: AP5DC, CE1FX, CO8BO, CT1EY, CX2CO, EP2AU, ET3JK, F9RY/FC, FG7XT, JT1KAA, JT1CA, PJ2AA, PZ1AX, PZ1CE, ST-2AR, SV0WT (Crete), VE3BG/SU, TG9MP, TL0RC, TT8AJ, UH8AY, VP6WR, VP7CC, VP-7NS, VP9BY, VQ4RF, VS9HAA (Kuria Muria), YO3ZA, YV0AA (Aves Is.), ZP5CP, ZP5OG, 5B4CZ, 6O1WF, 9A1AIJ, 9N1MM. A1 mode: CR-7FN, EL0B/MM, EP2BQ, ET3JK, FB8YY, FB-8ZZ (New Amsterdam), JT1KAA, HP1IE, LU3ZIL (Antarctica), MP4BEE, PJ2CK, VP-2AV (Antigua), VP6RG, VP8GQ, VQ4IN/VS9H, VQ4IQ, ZP5CF, YS1O, 5R8AI, YA1BW. Some QSLs rcd. were PJ3AO, VQ8AI, GB2SM, OH-2EW/OH0 (Ahland Is.), VP5DB, PJ5MF (Sint Martin), FG7XT, MP4QBF.

Don L2022 reports he is on 272 heard and finding new ones not too plentiful. He lists, 14 Mc. c.w.: HM1AP, ZK1AR, 5B4OS, SP6OM, AP5HQ, UW0FK, 5A3TX, AP5AR, UM8KAA, FB8ZZ, ZL5AA, UF6FN, VR2EH. 14 s.s.b.: VK-9DR Xmas Is., G2PU, PZ1AX, FK8AU, JT1CA, PJ2AA, VK0VK, HK3LX, XW8AL, BV1USG. 7 Mc. c.w.: UA0KCU, KX6BU, HA5KAG, YU-6FE, YU3BC, YO4CI, DJ8GB, FU8AG. 21 Mc. c.w.: JA1YL, YA1A, VS1FZ, F8IH, UD6DU, UA9EU. 1.8 Mc.: VK5KO.

Dave VK3QV has given up the struggle on 28 Mc. for the time being and dropped down to 21 Mc. where he wkd. on a.m. F3FZ, VK-9SM and all G areas as well as Js and Ws. On c.w. he wkd. F2MA, G6RJ, KR6ML, DJ4SG, OK1AFC, ON5ZO, SP9RF, SM5KV. Also hrd. were G2JB, DJ2AA, DJ8MI, MP4Q, ON4CK, SM5BPJ, SP7LA, VS1LG, OH5SM, OE2WDI, SP7HX, HS1S, KR6BF and many others. (This list shows that the band does open, which was proved in the "CQ" test when all continents were workable. The Europeans mostly at dusk. —Al.)

Eric BERS195.—Best loggings, heard 160 mx: VK5KO, ZL3OX, VK3ABT. 80 mx.: W4KFC, W6RW, Js. 40 mx: F2CB/FC, KR6NG, MP4QBF, VQ4IN/VS9H (Kuria Muria), VQ4IV, VS1LU, VS9HAA, ZB1BX, 4X4SW, YO4WR, JA6COM /MM. 20 mx: CN8FW, FU8AG, CO2BB, FB-8YY, HK3AH, HK5TD, HP1IE, HM1AS, KX6AJ, FB8ZZ, VP9FK, VK8HA, TG9AD, VR1G, VS-6EG, VU2GWG, UM8KAA, YV1DP, YV5DE, ZB1BX, VS9HAA, SV0DK and many more. QSLs rcd. KP5BTU, KZ5CU, UD6RW, UJ8AH, UL7BG, VK5HG, VQ2W, VR1N, 9M2FT, UM-8KAB, VK4WV (Willis Is.).

Peter Drew has sent in an enormous list of stations heard on all bands from 15 to 80 metres using all modes. There are over 500 stations listed and unfortunately space limitations do not permit printing same. The number of stations heard over a period of one month shows that the DX is certainly being heard in Western Australia.

THANKS

Thanks to HB9BX for this s.s.b. snippet:
1st voice: "Your signals are drifting badly."
2nd voice: "No. I am following you."
3rd voice: "You are both moving in opposite directions. My receiver must be haywire."

My thanks again to all those, who in 1963, took the time to write and help the column along.

A prosperous 1964 and DX to one and all. 73, Al, VK4SS.

VHF

The DX has arrived on 6 metres and each State is working its share. Many new calls are appearing and some old ones are being used again. All States (VK1, 2, 3, 4, 5, 6, 7, 8, 9) are represented, so with just a fair share of luck and good conditions there should be an increase in the 50 Mc. W.A.S. certificate awards.

VK9ZBV has been down south into VK3 on 29th Nov. A signal on 50.75 which could be 8ZCX has been heard a number of occasions in VK3 but no identification on the carrier.

JAs have been heard on at least three days during November in VK3. VK3ZER scored JA2AYM on 24th. I was copying the JA but could not positively identify him at the same Ron worked him at 1400. Others heard JAs as early as 0630 same day.

Northern VK4s have also been amongst the JAs in recent weeks.

The band has been open from ZL to VK since 23rd. First in VK3 on 27th with ZL3 and almost daily until end of the month.

Numerous odd signals from VK5 and VK7 heard in VK3 during openings, but nothing worked to date. Nothing heard from VK6 direction to the end of November.

The early closure of the notes leaves the page a little bare for this month. 73, 3ZGP.

QUEENSLAND

The v.h.f. meeting was held on Friday, 15th Nov., with about a dozen members present. At the meeting was the latest arrival on six metres—Roy 4ZRM, who puts out a fine signal from Annerley. Also on the air is Ron 4ZRJ who has recently returned from VK9. His operating frequency is 50.45 Mc. and is using 13w. to a 5763 and quarter wave length of hook-up wire. By the time you read this, he will have a 2 element beam in operation.

At the time of writing these notes, Malcolm 4ZEL and Allan 4ZAW are mobile somewhere in VK3. George 4ZLG is mobile and will be going to VK3 at the end of November.

The summer DX is coming good with VKs 1, 2, 3, 5 and 7 being worked and a VK6 has been heard also.

Victor 4ZBT gave a lecture on Satellites to the monthly meeting of W.I.A. Several of the Brisbane boys are interested and will endeavour to track the satellite. 73, 4ZDF.

WESTERN AUSTRALIA

Here in W.A. the coming of the summer months has meant a considerable rise in v.h.f. activity and as well as hearing a number of seldom-heard call signs on the air, a number of V.h.f. Group projects are also under way.

The 50 Mc. beacon tx which has been in operation at Cocos Is. for some time is being returned to Perth for an overhaul and it is planned to send it to Christmas Island where it will be operated by members of the Christmas Island Radio Club.

By the time that these notes are in print the new VK6VF beacon should be on the air and the details of operation are: Freq., 50.002 or 52.002 Mc. (depending on when the 50-52 Mc. band is lost); operation, virtually 24 hours a day; identification, call sign VK6VF keyed by using frequency shift keying (850 c.p.s. deviation); power, about 40 watts.

It is unfortunate that the new beacon was not ready for use sooner, but a considerable amount of work is entailed in building a beacon which is to run continuously. The old beacon, incidentally ran for a total of about 20,000 hours, using the original output valve (an 807).

A number of 70 Mc. f.m. mobile transceivers have been purchased by the Institute for use in conjunction with the W.I.C.E.N. organisation in this State and these units are being modified for use on the 50 Mc. band. Small quantities of 70 Mc. a.m. mobile transceivers are also starting to become available, but it hasn't been decided how these will be used as yet. There is a chance that these units could be converted to f.m. operation with surprisingly little work and if this is the case they will be used to expand the 50 Mc. f.m. net.

The only other news of interstate interest is that Trevor 6ZDZ will be operating portable in Adelaide during the University vacation and no doubt those in VK5-land will know that he is around by this time. 73, 6ZDB.

SWL

NEW SOUTH WALES

During 1963 the VK2 Group showed a marked improvement on previous years. Attendances at the meetings were quite good. I feel sure that if more of our Group would come along they would enjoy what is offered and would certainly come again. Our thanks go to Phil 2ZPI and Tim 2ZTM for their continued support, and their patience in imparting knowledge which is a great inspiration to s.w.l.'s. We are indeed fortunate in having two such stalwarts who are always there to help us on our way.

Our October meeting was a great success. Phil 2ZPI gave an interesting talk on how to construct an all-band antenna and explained a three-transistor converter for 3.5, 7 and 14 Mc. If any s.w.l. would like a copy of the above converter circuit, just drop me a line, plus a stamp and its yours.

Our Secretary still has a few copies of the AR7 manual on hand and members can purchase same for 10/6 plus postage. Write to Tom Harding, 33 Waratah St., Berowa, N.S.W.

We offer our congratulations to Ross L2233/VK4 and to L2023 for their respective wins in the last N.F.D. Contest; good work lads.

Sid L2258 has his AMR300 going on all bands except 80 mx at the moment. He sends word of logging OA, G and F2, which is not bad going on any rx. Sid intends having a go for his ticket and we wish him well.

Ross L2233/VK4, who lives in the Rockhampton area, sends news of the prospects of a new rx, a GR59. He intends to use his 163T for portable work and the other for his fixed station receiver.

Chas. L2211 reports that his 50 Mc. converter is not working, but Vince VK2VC has the matter under control.

Thought for the month: Use the right tool for the right job. 73, Chas. L2211.

DX LADDER

	Countries Conf.	Countries Hrd.	Zns. Conf.	S.s.b. Conf.	S.s.b. Hrd.	W Stat.
E. Trebilcock	282	289	40	—	—	50
D. Grantley	113	272	38	20	104	35
A. Westcott	93	159	31	9	107	11
M. Hilliard	83	235	33	29	165	12
M. Cox	80	229	29	39	150	18
P. Drew	66	199	27	29	131	14
C. Aberneathy	56	96	30	—	—	—
N. Harrison	44	119	29	4	20	35
I. Thomas	42	139	20	16	97	14
G. Earl	38	131	22	20	104	3

TYPE F1 EMISSION

Postmaster-General's Department

Treasury Place,
Melbourne, C.2, Vic.
13th Nov., 1963

Federal Secretary,
Wireless Institute of Aust.,
Box 2611W, Melbourne.

Dear Sir,

Further to our letter dated 26th July, 1963, in connection with type F1 emission in the Amateur Service (your letter of the 8th September refers), arrangements have now been made with effect forthwith to include type F1 emission, employing a maximum frequency shift of 850 c.p.s., in the types of emission permitted for use by the Amateur Service within all authorised frequency bands. The use of type F1 emission shall be confined to radio-teletype (R.T.T.Y.) systems employing a teleprinter type equipment using perforated tape or direct keyboard transmission and a printing mechanism for reception. The use of hand-speed Morse utilising type F1 emission is prohibited. R.T.T.Y. transmissions shall employ a five-unit code in accordance with International Alphabet No. 2.

For purposes of station identification in accordance with paragraphs 132 and 133 of the "Handbook for Operators of Radio Stations in the Amateur Service," July, 1963, which read—

"132. The operator of an Amateur Station shall transmit the call sign of the station being worked and the call sign allotted to the station that he is operating at the beginning and end of each session, and at least once in every five minutes during the session.

133. Call signs must, in all cases, be signalled in full and in such a manner as to leave no doubt as to their identity, and must include the nationality prefix letters 'VK',"

an Amateur Station licensee employing type F1 emission shall transmit call signs either by means of hand-speed Morse (type A1) or radio telephony (types A3 or F3) signals.

It is not proposed that the Department inform each Amateur Station licensee of the new condition at this stage, but it would be appreciated if you would be good enough to arrange for appropriate publicity through the Institute's Divisional Broadcasts and Magazine "Amateur Radio," please.

Yours faithfully,

(Sgd.) L. F. Pearson,
for Director-General.

NOTES

FEDERAL

FEDERAL CONSTITUTION ALTERATION

Federal Executive, on behalf of the Federal Council of the Wireless Institute of Australia, hereby gives notice that it is intended to alter the **Federal Constitution of the Wireless Institute of Australia 1947** as follows:—

(a) Delete Clause 21 and substitute—

"21. The Headquarters Division shall call for nominations annually from its members for appointment to the Federal Executive, such nominations to be received not less than 60 days prior to the conclusion of the fiscal year. The nominations which shall include the names of any retiring members of Federal Executive willing to re-nominate shall be submitted by the Headquarters Division to Federal Council for the appointment by preferential vote of seven members, two at least of whom shall be retiring members."

(b) Insert new Clause 21a—

"21a. The new Federal Executive shall take office at the conclusion of the Federal Convention which they shall attend, or where a Federal Convention is not held, within one month of the conclusion of the fiscal year. The Federal Executive shall determine its own offices in such manner as considered necessary."

(c) Delete Clause 24 and substitute—

"24. The appointment of Federal Executive which shall be finalised by the Headquarters Division not less than 14 days prior to the conclusion of the fiscal year shall be notified in writing to Federal Council prior to the conclusion of the fiscal year. The Federal Executive shall notify Federal Council in writing of the offices and appointees thereto within 28 days of the commencement of the new fiscal year or the Federal Convention whichever is the sooner."

Any member of the Institute not in agreement with the proposed alterations should notify his disapproval and the reasons to the Federal Secretary within 14 days of the publication of this proposal.

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FEDERAL QSL BUREAU

The new address for the W2-K2 QSL Bureau is North Jersey DX Association, P.O. Box 303, Bradley Beach, N.J., U.S.A.

Graham VK2AGH will handle any cards for VK4HG and VK4WV who were at Willis Island and also for VK4JQ who is presently at Willis.

Albert Zander, VK3PG, who was active on the h.f., v.h.f. and u.h.f. bands for many years until 1960, has decided to make a comeback. Bert has acquired some very fine gear and should soon be heard on s.s.b. and later on c.w. Gear consists of HT transmitter, SX receiver and a TA33 Jnr. mounted on a fine tower.

Bruno Bossert, HB9QO, was due to arrive in Australia on 28th November and after a stay of about six weeks in Sydney will come on to Melbourne where he will be employed by Landis and Gyr for about two years. Bruno hopes to become active under a VK call sign. Writer had the good fortune to meet Bruno at his home at Nottwil just outside Lucerne.

Preliminary details of the 1964 A.R.R.L. International DX Contest have been received. The dates are: Phone, Feb. 8/9 and March 14/15; C.w., Feb. 22/23 and March 28/29. The rules are unchanged from 1963.

—Ray Jones, VK3RJ, Manager.

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NEW SOUTH WALES

HUNTER BRANCH

The December meeting of the Branch took the form of a combined Christmas meeting and welcome back to Lionel 2CS. A large gathering of 45 members, visitors and associates, including quite a number of ladies, watched with great interest as the guest of honour, Lionel, showed and commentated on a number of very interesting projected transparencies illustrating his world tour. All this, together with the pleasant chat after the meeting, made for a most enjoyable evening and all who attended agreed.

Amateur activity in Cessnock is at a peak at present with the formation of a new Radio Club under the patronage of Chris 2PZ. This club, which has the call sign 2AXC, is closely linked with the Cessnock branch of the Civil Defence. They should be on 40 and 80 mx very soon and there is a rumour that one of the items of equipment to be used is an AT21, so there should be no shortage of signals.

Whether there will be an increase in signal strength from 2AWX this year remains a matter of conjecture. Plans are in hand for an increase in power so the best thing to do is to listen to the local broadcast on 20th Jan. and judge for yourself. About this time also there will be some examination activity locally when several candidates will present themselves for the A.O.C.P. Paddy Maloney was successful at the October exam. and we are now waiting to hear what his call will be.

Late in November the Scone Apex Club held a hobbies and crafts exhibition at which an Amateur Station signing 2AWX/P was in operation. This activity further enhanced the good name of the W.I.A. and Radio Amateurs in the Hunter Valley and introduced many to the hobby for the first time.

If you see a large steel structure at Bennetts Green in the future, be not afraid. It is Ross' new mast—about 120 feet high and ex a broadcast station—which was given to him! Jack 2KQ has his gear back in operation and is putting in a fine signal. Gordon 2ZSG has found the hum in his rx. It turned out to be some unshielded leads in the two in line and not a noise from the distillery as was first imagined. Bill 2ZL is making very good use of the new tape recorder. He has recorded the voices of all the local boys and is making a secret sound tape for one of our forthcoming meetings. Frank 2FC has discovered a new sine wave distorter. The trouble is he found it in his modulator. Frank 2APO is working on our behalf again and is arranging that the film "Friendship 7" will be available for screening at the next meeting. This is a really good film and is very worthwhile seeing.

Regarding the next meeting, which will be on 7th February, it is hoped that it will be in room 15 at the Tech. College. However, since arrangements may change in the new year, it would be as well to listen to 2AWX for the final arrangements. Remember that 2AWX broadcasts news each Monday at 7 p.m. on 3595 and 144.443 Mc. and that meetings are held on the first Friday of each month, excepting January, at 8 p.m. in the Technical College, Tighes Hill. See if you can get more contacts and better DX in 1964 and let's use all the bands all the time we can. All the best for the New, Year. 73, 2AKX.

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QUEENSLAND

TOWNSVILLE AND DISTRICT

As these notes appear the old year will be gone and the new one off to a bright start, as the conditions appear to be on the up grade. European stations can be heard coming through in the afternoon and everyone of us trying to get a contact with the resultant bedlam.

The near north causing some consternation due (maybe) to the conditions interfering with the outback radios on the Flying Doctor Service and the Ambulance Service. Looks like the I.T.U. band allocations are being disregarded. Wonder what would happen if it was a poor Amateur?

Things are very quiet here locally and not many working the 14 Mc. band, although can hear a few of the old timers rag-chewing on 7 Mc. and seem content to let the DX stations go by. Apparently they have given up the rat race in chasing those elusive awards, which seems to get many in.

Herb 4JW heard after a long time from Charters Towers, not like when in Cairns, must have a new interest. Vern 4LK only heard, working Ken, while the Ingham boys are not heard at all. Basil seems to be still holding the fort for the Cairns gang and Claude from Ayr a bit uphill now he has sold that beaut. receiver and uses a makeshift. Bert still trying for better output from the quad. Heard that one of the locals is in for a transfer to the bright lights after many years here—still hush-hush. 73, 4RW.

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TASMANIA

Around 26/11/63 2AXR visited southern VK7 and was shown around quite a few of the shacks. Al was relieving Radio Officer aboard the Patina on the Sydney-Hobart run. Hope you enjoyed your brief visit Al and will be back again some time. Ian 7ZZ is back on deck again and once again hard at work. Still finds time for the DX though, and recently worked VK0BE (VK7ZBE) down in the white wastes. Brien is apparently having a whale of a time, enjoying really hot days—up around 27 degrees. Knowing Brien, I guess he is the life of the party down there.

During the latter part of October, Snowy 7CH operated maritime mobile from his yacht in the vicinity of Bruni Island for a week.

The Hamfest at Cambell Town in November was a success with an attendance of 47 members. A good time was had by all and the weather was reasonably good for camping, just holding off a really strong blow towards the end of Sunday afternoon. Look forward to seeing you there again next year. An article will be published in the mag. later this year giving fuller details of the week-end's activity.

That's it for this month chaps, all the best for the New Year, 73, Mike 7ZAV.

HAMADS

Minimum 5/-, for thirty words. Extra words, 2d. each.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. **Copy must be received at P.O. Box 36, East Melbourne, C.2, Vic., by 8th of the month, and remittance should accompany the advertisement.** Call signs are now permitted in Hamads. **Dealers' advertisements not accepted in this column.**

FOR SALE: Collins ART13 Transmitter, 813 final modulated by two 811s, good disposals condition, unmodified, complete with low frequency v.f.o., original supply, large manual, and all tubes, £25. ATR2B Transceiver, working with all tubes and d.c. power supply £15. 1 only 122, complete with power supply, etc., unmodified, good working condition, £15. 1 only 122, complete with power supply, valves, etc., but not working, £5. VK2AAK, Kulnura, N.S.W.

FOR SALE: Prop. Pitch Motor £10. 6 Kc. a.m. Mechanical Filter, brand new and unused, £7/12/6. H. Hepburn, VK3AFQ, 4 Elizabeth St., East Brighton, Vic. **96-2414 evenings.**

FOR SALE: 1 only 12 volt Tafaz (imported) Transistorised Power Supply for Swan or Collins, or similar, Transceiver. Good condition, very little use and very compact. £60. VK2AAK, Kulnura, N.S.W.

SELL your own **Personal** gear through Hamads. Persons trading in any line, regardless of price, or quantities of similar articles, will be charged commercial rates.

WANTED: Xmitter, all bands, c.w.-a.m. or c.w.-s.s.b., 100 watts max. Also all-band 3 element beam. Bill Barber, VK6DX, 15 Whitlock Street, Kalgoorlie, W.A.